### TABLE OF CONTENTS

Texas A&M University Purpose/Accreditation.......................... 12
Publication Statement ............................................................. 14
University Academic Calendar .............................................. 15
Board of Regents and Administrative Officers ......................... 19
General Information ............................................................... 20
  History and Development ..................................................... 20
  University Core Curriculum ............................................... 21
  Student Learning Outcomes ............................................... 26
  Degree Information ........................................................... 27
    International and Cultural Diversity Requirements ............ 40
  Admission ........................................................................ 45
  Registration and Academic Status ....................................... 74
  Grading System ................................................................ 76
  Housing ........................................................................... 78
  Orientation ....................................................................... 79
  Services for Students ......................................................... 80
  Campus Life ................................................................... 84
Tuition, Fees and Other Financial Information .......................... 89
  Financial Assistance and Scholarships ................................. 97
University Policies ................................................................. 101
International Opportunities for Students ................................. 102
Honors and Undergraduate Research ..................................... 103
Transition Academic Programs ............................................. 107
University Studies Degrees .................................................... 108
Interdisciplinary Degree Programs ......................................... 109
  Juris Doctor Program ......................................................... 109
  Neuroscience .................................................................. 110
    Neuroscience - Minor ..................................................... 110
    Neuroscience - Certificate ............................................. 111
College of Agriculture and Life Sciences ................................. 113
  Interdepartmental Degree Programs .................................... 118
Agricultural Economics ......................................................... 118
  Agribusiness - BS ............................................................ 120
  Agricultural Economics - BS, Finance and Real Estate Option 122
  Agricultural Economics - BS, Food Marketing Systems Option 123
  Agricultural Economics - BS, Policy and Economic Analysis Option 124
  Agricultural Economics - BS, Rural Entrepreneurship Option 125
  Agricultural Economics - 5-Year Bachelor of Science/Master of Public Service Administration ........................................ 126
  Agribusiness Entrepreneurship - Minor ................................ 128
  Agricultural Economics - Minor ........................................... 129
  AgriFood Sales - Minor ..................................................... 129
  Financial Planning - Minor ................................................ 130
  International Trade and Agriculture - Certificate .................. 130
Agricultural Leadership, Education, and Communications ...... 131
  Agricultural Communications and Journalism - BS ............ 132
  Agricultural Leadership and Development - BS .................. 133
  Agricultural Science - BS .................................................. 134
  University Studies, BS, Leadership Studies Concentration .... 135
  Agricultural Communications and Journalism - Minor ....... 135
  Extension Education - Minor ............................................. 136
  International Agricultural Development - Minor .................. 136
  Leadership - Minor .......................................................... 136
Animal Science ................................................................. 137
  Animal Science - BS, Production/Industry Option ................ 138
  Animal Science - BS, Science Option .................................. 140
  Equine Science - Certificate .............................................. 141
  Meat Science - Certificate ................................................ 141
Biochemistry and Biophysics ............................................... 142
  Biochemistry - BS ........................................................... 143
  Genetics - BS ................................................................ 144
  Biochemistry - Minor ....................................................... 146
  Genetics - Minor ............................................................. 146
Biological and Agricultural Engineering ................................. 146
  Agricultural Systems Management - BS ............................ 147
  Biological and Agricultural Engineering - BS .................... 148
  Agricultural Systems Management - Minor ....................... 150
Ecosystem Science and Management ....................................... 150
  Ecological Restoration - BS .............................................. 151
  Forestry - BS .................................................................. 152
  Rangeland Ecology and Management - BS, Ranch Management Option .................................................. 153
  Rangeland Ecology and Management - BS, Rangeland Resources Option ................................................. 155
  Renewable Natural Resources - BS .................................... 156
  Spatial Science - BS ......................................................... 158
  Forestry - Minor ............................................................. 158
  Rangeland Ecology and Management - Minor .................... 159
  Spatial Sciences - Minor ................................................. 159
  Watershed - Certificate .................................................... 159
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entomology</td>
<td>160</td>
</tr>
<tr>
<td>Entomology - BS</td>
<td>161</td>
</tr>
<tr>
<td>Forensic and Investigative Sciences - BS, Pre-Law Emphasis</td>
<td>163</td>
</tr>
<tr>
<td>Forensic and Investigative Sciences - BS, Science Emphasis</td>
<td>165</td>
</tr>
<tr>
<td>Entomology - Minor</td>
<td>166</td>
</tr>
<tr>
<td>Public Health Entomology - Certificate</td>
<td>167</td>
</tr>
<tr>
<td>Horticultural Sciences</td>
<td>168</td>
</tr>
<tr>
<td>Horticulture - BA</td>
<td>168</td>
</tr>
<tr>
<td>Horticulture - BS</td>
<td>169</td>
</tr>
<tr>
<td>Horticulture - Minor</td>
<td>170</td>
</tr>
<tr>
<td>Enology - Certificate</td>
<td>170</td>
</tr>
<tr>
<td>Nutrition and Food Science</td>
<td>171</td>
</tr>
<tr>
<td>Food Science and Technology - BS, Food Industry Option</td>
<td>172</td>
</tr>
<tr>
<td>Food Science and Technology - BS, Food Science Option</td>
<td>174</td>
</tr>
<tr>
<td>Nutrition - BS, Didactic Program in Dietetics Track</td>
<td>176</td>
</tr>
<tr>
<td>Nutrition - BS, General Nutrition Track</td>
<td>177</td>
</tr>
<tr>
<td>Nutrition - BS, Molecular and Experimental Track</td>
<td>179</td>
</tr>
<tr>
<td>Plant Pathology and Microbiology</td>
<td>180</td>
</tr>
<tr>
<td>Bioenvironmental Sciences - BS</td>
<td>181</td>
</tr>
<tr>
<td>Environmental Studies - BS</td>
<td>182</td>
</tr>
<tr>
<td>University Studies - BS, Environmental Business Concentration</td>
<td>183</td>
</tr>
<tr>
<td>Bioenvironmental Sciences - Minor</td>
<td>184</td>
</tr>
<tr>
<td>Poultry Science</td>
<td>185</td>
</tr>
<tr>
<td>Poultry Science - BS, Industry Emphasis</td>
<td>185</td>
</tr>
<tr>
<td>Poultry Science - BS, Technical Emphasis</td>
<td>186</td>
</tr>
<tr>
<td>Poultry Science - Minor</td>
<td>187</td>
</tr>
<tr>
<td>Recreation, Park and Tourism Sciences</td>
<td>187</td>
</tr>
<tr>
<td>Recreation, Park and Tourism Sciences - BS with Certificate</td>
<td>189</td>
</tr>
<tr>
<td>Renewable Natural Resources - BS</td>
<td>156</td>
</tr>
<tr>
<td>Park and Natural Resource Management - Minor</td>
<td>192</td>
</tr>
<tr>
<td>Recreation, Park and Tourism Sciences - Minor</td>
<td>193</td>
</tr>
<tr>
<td>Tourism Management - Minor</td>
<td>193</td>
</tr>
<tr>
<td>Youth Development - Minor</td>
<td>193</td>
</tr>
<tr>
<td>Community Recreation and Park Administration - Certificate</td>
<td>194</td>
</tr>
<tr>
<td>Hospitality Management - Certificate</td>
<td>194</td>
</tr>
<tr>
<td>Parks and Conservation - Certificate</td>
<td>194</td>
</tr>
<tr>
<td>Professional Event Manager - Certificate</td>
<td>195</td>
</tr>
<tr>
<td>Tourism Management - Certificate</td>
<td>195</td>
</tr>
<tr>
<td>Youth Development - Certificate</td>
<td>195</td>
</tr>
<tr>
<td>Soil and Crop Sciences</td>
<td>196</td>
</tr>
<tr>
<td>Plant and Environmental Soil Science - BS, Crops Emphasis</td>
<td>197</td>
</tr>
<tr>
<td>Plant and Environmental Soil Science - BS, Soil and Water Emphasis</td>
<td>198</td>
</tr>
<tr>
<td>Turfgrass Science - BS</td>
<td>199</td>
</tr>
<tr>
<td>Agronomy - Minor</td>
<td>200</td>
</tr>
<tr>
<td>Environmental Soil Science - Minor</td>
<td>200</td>
</tr>
<tr>
<td>Plant Breeding - Minor</td>
<td>201</td>
</tr>
<tr>
<td>University Studies Programs</td>
<td>201</td>
</tr>
<tr>
<td>University Studies - BS, Environmental Business Concentration</td>
<td>201</td>
</tr>
<tr>
<td>University Studies - BS, Leadership Studies Concentration</td>
<td>135</td>
</tr>
<tr>
<td>Wildlife and Fisheries Sciences</td>
<td>203</td>
</tr>
<tr>
<td>Renewable Natural Resources - BS</td>
<td>156</td>
</tr>
<tr>
<td>Wildlife and Fisheries Sciences - BS, Aquatic Ecology and Conservation Option</td>
<td>205</td>
</tr>
<tr>
<td>Wildlife and Fisheries Sciences - BS, Vertebrate Zoology Option</td>
<td>206</td>
</tr>
<tr>
<td>Wildlife and Fisheries Sciences - BS, Wildlife Ecology and Conservation Option</td>
<td>208</td>
</tr>
<tr>
<td>Wildlife and Fisheries Sciences - Minor</td>
<td>209</td>
</tr>
<tr>
<td>College of Architecture</td>
<td>210</td>
</tr>
<tr>
<td>Global Culture and Society - Minor</td>
<td>212</td>
</tr>
<tr>
<td>Diversity - Certificate</td>
<td>212</td>
</tr>
<tr>
<td>Architecture</td>
<td>212</td>
</tr>
<tr>
<td>Environmental Design Architectural Studies - BED</td>
<td>215</td>
</tr>
<tr>
<td>Architectural Fabrication and Product Design - Minor</td>
<td>216</td>
</tr>
<tr>
<td>Architectural Heritage Conservation - Minor</td>
<td>216</td>
</tr>
<tr>
<td>Art and Architecture History - Minor</td>
<td>216</td>
</tr>
<tr>
<td>Global Art Design and Construction - Minor</td>
<td>217</td>
</tr>
<tr>
<td>Sustainable Architecture and Planning - Minor</td>
<td>217</td>
</tr>
<tr>
<td>Construction Science</td>
<td>218</td>
</tr>
<tr>
<td>Construction Science - BS</td>
<td>220</td>
</tr>
<tr>
<td>Facility Management - Minor</td>
<td>221</td>
</tr>
<tr>
<td>Leadership in the Design and Construction Professions - Minor</td>
<td>221</td>
</tr>
<tr>
<td>Landscape Architecture and Urban Planning</td>
<td>222</td>
</tr>
<tr>
<td>Landscape Architecture - BLA</td>
<td>224</td>
</tr>
<tr>
<td>Landscape Architecture - 6-Year Bachelor of Landscape Architecture/Master of Land and Property Development</td>
<td>225</td>
</tr>
<tr>
<td>Landscape Architecture - 6-Year Bachelor of Landscape Architecture/Master of Urban Planning</td>
<td>226</td>
</tr>
<tr>
<td>Urban and Regional Planning - BS</td>
<td>227</td>
</tr>
<tr>
<td>Program</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Urban and Regional Planning - 5-Year Bachelor of Science/Master of Land and Property Development</td>
<td>228</td>
</tr>
<tr>
<td>Urban and Regional Planning - 5-Year Bachelor of Science/Master of Urban Planning</td>
<td>229</td>
</tr>
<tr>
<td>Urban and Regional Planning - Minor</td>
<td>230</td>
</tr>
<tr>
<td>University Studies Programs</td>
<td>230</td>
</tr>
<tr>
<td>University Studies - BS, Global Arts, Planning, Design and Construction Concentration</td>
<td>230</td>
</tr>
<tr>
<td>Visualization</td>
<td>231</td>
</tr>
<tr>
<td>Visualization - BS</td>
<td>233</td>
</tr>
<tr>
<td>Art - Minor</td>
<td>233</td>
</tr>
<tr>
<td>Game Design and Development - Minor</td>
<td>234</td>
</tr>
<tr>
<td>Mays Business School</td>
<td>235</td>
</tr>
<tr>
<td>Business Honors - BBA</td>
<td>238</td>
</tr>
<tr>
<td>Business - Minor</td>
<td>240</td>
</tr>
<tr>
<td>European Union Business - Certificate</td>
<td>241</td>
</tr>
<tr>
<td>International Business Studies - Certificate</td>
<td>241</td>
</tr>
<tr>
<td>Latin American Business - Certificate</td>
<td>243</td>
</tr>
<tr>
<td>Nonprofit and Social Innovation - Certificate</td>
<td>244</td>
</tr>
<tr>
<td>Accounting - BBA</td>
<td>244</td>
</tr>
<tr>
<td>Accounting - 5-Year Bachelor of Business Administration/Master of Financial Management</td>
<td>248</td>
</tr>
<tr>
<td>Accounting - 5-Year Bachelor of Business Administration/Master of Science</td>
<td>249</td>
</tr>
<tr>
<td>Energy Accounting - Certificate</td>
<td>249</td>
</tr>
<tr>
<td>Internal Audit - Certificate</td>
<td>250</td>
</tr>
<tr>
<td>Finance</td>
<td>250</td>
</tr>
<tr>
<td>Finance - BBA</td>
<td>251</td>
</tr>
<tr>
<td>Commercial Banking - Certificate</td>
<td>253</td>
</tr>
<tr>
<td>Investment Banking - Certificate</td>
<td>253</td>
</tr>
<tr>
<td>Trading, Risk and Investments - Certificate</td>
<td>254</td>
</tr>
<tr>
<td>Information and Operations Management</td>
<td>254</td>
</tr>
<tr>
<td>Management Information Systems - BBA</td>
<td>255</td>
</tr>
<tr>
<td>Supply Chain Management - BBA</td>
<td>257</td>
</tr>
<tr>
<td>Management</td>
<td>259</td>
</tr>
<tr>
<td>Management - BBA, Consulting/General Management Track</td>
<td>261</td>
</tr>
<tr>
<td>Management - BBA, Entrepreneurial Leadership Track</td>
<td>263</td>
</tr>
<tr>
<td>Management - BBA, Human Resource Management Track</td>
<td>265</td>
</tr>
<tr>
<td>Management - BBA, Nonprofit Management Track</td>
<td>267</td>
</tr>
<tr>
<td>Management - BBA, Pre-Law Track</td>
<td>269</td>
</tr>
<tr>
<td>Entrepreneurial Leadership - Certificate</td>
<td>271</td>
</tr>
<tr>
<td>Marketing</td>
<td>271</td>
</tr>
<tr>
<td>Marketing - BBA, Advertising Strategy Track</td>
<td>273</td>
</tr>
<tr>
<td>Marketing - BBA, Analytics and Consulting Track</td>
<td>275</td>
</tr>
<tr>
<td>Marketing - BBA, Professional Selling and Sales Management Track</td>
<td>277</td>
</tr>
<tr>
<td>Marketing - BBA, Retail Buying and Management Track</td>
<td>279</td>
</tr>
<tr>
<td>Advertising Strategy - Certificate</td>
<td>281</td>
</tr>
<tr>
<td>Analytics and Consulting - Certificate</td>
<td>281</td>
</tr>
<tr>
<td>Professional Selling and Sales Management - Certificate</td>
<td>282</td>
</tr>
<tr>
<td>Retail Buying and Management - Certificate</td>
<td>282</td>
</tr>
<tr>
<td>University Studies Programs</td>
<td>283</td>
</tr>
<tr>
<td>University Studies - BS, Business Concentration</td>
<td>283</td>
</tr>
<tr>
<td>College of Dentistry</td>
<td>285</td>
</tr>
<tr>
<td>Caruth School of Dental Hygiene</td>
<td>285</td>
</tr>
<tr>
<td>Dental Hygiene - BS</td>
<td>286</td>
</tr>
<tr>
<td>College of Education and Human Development</td>
<td>288</td>
</tr>
<tr>
<td>Educational Administration and Human Resource Development</td>
<td>291</td>
</tr>
<tr>
<td>Human Resource Development - BS</td>
<td>293</td>
</tr>
<tr>
<td>Technology Management - BS</td>
<td>294</td>
</tr>
<tr>
<td>Human Resource Development Minor</td>
<td>295</td>
</tr>
<tr>
<td>Technology Management - Minor</td>
<td>295</td>
</tr>
<tr>
<td>Educational Psychology</td>
<td>296</td>
</tr>
<tr>
<td>Interdisciplinary Studies - BS, Bilingual Education EC-6</td>
<td>298</td>
</tr>
<tr>
<td>Interdisciplinary Studies - BS, Special Education EC-12</td>
<td>299</td>
</tr>
<tr>
<td>University Studies - BS, Child Professional Services Concentration</td>
<td>300</td>
</tr>
<tr>
<td>Creative Studies - Minor</td>
<td>301</td>
</tr>
<tr>
<td>Creative Studies - Certificate</td>
<td>302</td>
</tr>
<tr>
<td>Health and Kinesiology</td>
<td>302</td>
</tr>
<tr>
<td>Community Health - BS</td>
<td>309</td>
</tr>
<tr>
<td>Health - BS, Allied Health Track</td>
<td>311</td>
</tr>
<tr>
<td>Health - BS, School Health Track</td>
<td>312</td>
</tr>
<tr>
<td>Kinesiology - BS, All-Level Physical Education Teacher Certification Track</td>
<td>313</td>
</tr>
<tr>
<td>Kinesiology - BS, Dance Science Track</td>
<td>314</td>
</tr>
<tr>
<td>Kinesiology - BS, Exercise Science Track, Applied Exercise Physiology Concentration</td>
<td>316</td>
</tr>
<tr>
<td>Kinesiology - BS, Exercise Science Track, Basic Exercise Physiology Concentration</td>
<td>317</td>
</tr>
<tr>
<td>Kinesiology - BS, Exercise Science Track, Motor Behavior Concentration</td>
<td>318</td>
</tr>
<tr>
<td>Kinesiology - 5-Year BS/MS</td>
<td>319</td>
</tr>
<tr>
<td>Sport Management - BS, Internship Track</td>
<td>321</td>
</tr>
<tr>
<td>Sport Management - BS, Non-internship Track</td>
<td>322</td>
</tr>
<tr>
<td>Program</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>University Studies - BS, Dance Concentration</td>
<td>323</td>
</tr>
<tr>
<td>University Studies - BS, Sports Conditioning Concentration</td>
<td>324</td>
</tr>
<tr>
<td>Coaching - Minor</td>
<td>325</td>
</tr>
<tr>
<td>Dance - Minor</td>
<td>326</td>
</tr>
<tr>
<td>Sport Management - Minor</td>
<td>326</td>
</tr>
<tr>
<td>Teaching, Learning and Culture</td>
<td>326</td>
</tr>
<tr>
<td>Interdisciplinary Studies - BS, English Language Arts/Social Studies, Middle Grades Certification</td>
<td>330</td>
</tr>
<tr>
<td>Interdisciplinary Studies - BS, Math/Science, Middle Grades Certification</td>
<td>331</td>
</tr>
<tr>
<td>Interdisciplinary Studies - BS, PreK-6, Generalist Certification</td>
<td>332</td>
</tr>
<tr>
<td>Secondary Graduate Certification Program</td>
<td>333</td>
</tr>
<tr>
<td>STEM - Minor</td>
<td>334</td>
</tr>
<tr>
<td>University Studies Programs</td>
<td>334</td>
</tr>
<tr>
<td>University Studies - BS, Child Professional Services Concentration</td>
<td>300</td>
</tr>
<tr>
<td>University Studies - BS, Dance Concentration</td>
<td>323</td>
</tr>
<tr>
<td>University Studies - BS, Sports Conditioning Concentration</td>
<td>324</td>
</tr>
<tr>
<td>College of Engineering</td>
<td>338</td>
</tr>
<tr>
<td>Biological and Agricultural Engineering - BS</td>
<td>344</td>
</tr>
<tr>
<td>Interdisciplinary Engineering - BS</td>
<td>346</td>
</tr>
<tr>
<td>Cybersecurity - BS</td>
<td>346</td>
</tr>
<tr>
<td>Engineering Project Management - Minor</td>
<td>347</td>
</tr>
<tr>
<td>Business Management - Certificate</td>
<td>348</td>
</tr>
<tr>
<td>Engineering Honors - Certificate</td>
<td>349</td>
</tr>
<tr>
<td>Engineering Leadership - Certificate</td>
<td>349</td>
</tr>
<tr>
<td>International Engineering - Certificate</td>
<td>349</td>
</tr>
<tr>
<td>Polymer Specialty - Certificate</td>
<td>349</td>
</tr>
<tr>
<td>Safety Engineering - Certificate</td>
<td>350</td>
</tr>
<tr>
<td>Aerospace Engineering</td>
<td>350</td>
</tr>
<tr>
<td>Aerospace Engineering - BS</td>
<td>353</td>
</tr>
<tr>
<td>Aerospace Engineering - Minor</td>
<td>354</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>354</td>
</tr>
<tr>
<td>Biomedical Engineering - BS</td>
<td>356</td>
</tr>
<tr>
<td>Biomedical Engineering - Minor</td>
<td>358</td>
</tr>
<tr>
<td>Engineering Therapeutics Manufacturing - Certificate</td>
<td>359</td>
</tr>
<tr>
<td>Quality Engineering for Regulated Medical Technologies - Certificate</td>
<td>359</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>360</td>
</tr>
<tr>
<td>Chemical Engineering - BS</td>
<td>362</td>
</tr>
<tr>
<td>Chemical Engineering - Minor</td>
<td>363</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>363</td>
</tr>
<tr>
<td>Civil Engineering - BS</td>
<td>366</td>
</tr>
<tr>
<td>Civil Engineering, BS - Coastal and Ocean Engineering Track</td>
<td>367</td>
</tr>
<tr>
<td>Civil Engineering - BS, Construction Engineering and Management Track</td>
<td>369</td>
</tr>
<tr>
<td>Civil Engineering - BS, Environmental Engineering Track</td>
<td>371</td>
</tr>
<tr>
<td>Civil Engineering - BS, General Civil Engineering Track</td>
<td>373</td>
</tr>
<tr>
<td>Civil Engineering - BS, Geotechnical Engineering Track</td>
<td>376</td>
</tr>
<tr>
<td>Civil Engineering - BS, Structural Engineering Track</td>
<td>377</td>
</tr>
<tr>
<td>Civil Engineering - BS, Transportation Engineering Track</td>
<td>379</td>
</tr>
<tr>
<td>Civil Engineering - BS, Water Resources Engineering Track</td>
<td>381</td>
</tr>
<tr>
<td>Computer Science and Engineering</td>
<td>383</td>
</tr>
<tr>
<td>Computer Engineering - BS, Computer Science Track</td>
<td>384</td>
</tr>
<tr>
<td>Computer Science - BS</td>
<td>386</td>
</tr>
<tr>
<td>Computer Science - Minor</td>
<td>387</td>
</tr>
<tr>
<td>Game Design and Development - Minor</td>
<td>388</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>388</td>
</tr>
<tr>
<td>Computer Engineering - BS, Electrical Engineering Track</td>
<td>388</td>
</tr>
<tr>
<td>Electrical Engineering - BS</td>
<td>390</td>
</tr>
<tr>
<td>Electrical Engineering - Minor</td>
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<td>Engineering Technology and Industrial Distribution</td>
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</tr>
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<td>Electronic Systems Engineering Technology - BS</td>
<td>393</td>
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<td>Industrial Distribution - BS</td>
<td>394</td>
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<td>Manufacturing and Mechanical Engineering Technology - BS</td>
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</tr>
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<td>Multidisciplinary Engineering Technology - BS</td>
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<td>Embedded Systems Integration Minor</td>
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<td>Industrial and Systems Engineering</td>
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<td>Data Center Operations Engineering - Certificate</td>
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<td>Engineering Systems Management - Certificate</td>
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<td>Analysis, Design and Management of Energy Conversion Systems - Minor</td>
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<td>Control of Mechanical Systems - Minor</td>
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<td>Design and Simulation of Mechanical Systems - Minor</td>
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<td>412</td>
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<td>College of Geosciences</td>
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<td>Environmental Geosciences - BS / MOST, 2+1 Program</td>
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<tr>
<td>Environmental Studies - BS</td>
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<td>Climate Change - Minor</td>
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</tr>
<tr>
<td>Earth Sciences - Minor</td>
<td>.................................................. 432</td>
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<td>Environmental Geosciences - Minor</td>
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<td>Diversity Certificate</td>
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<td>Atmospheric Sciences</td>
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<td>Meteorology - BS / MOST, 3+2 Program</td>
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<td>Geography</td>
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<td>Geographic Information Science and Technology - BS, Computation, Design and Analysis Track</td>
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<td>Geographic Information Science and Technology - BS, Earth Systems and Analysis Track</td>
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<td>Geographic Information Science and Technology - B.S., Human Systems and Society Track</td>
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<td>Geography - BS</td>
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<td>University Studies - BS, Geographic Information Science and Technology Concentration</td>
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<td>Geology and Geophysics</td>
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<td>University Studies Programs</td>
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</tr>
<tr>
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<td>University Studies - BS, Geography Concentration</td>
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<tr>
<td>College of Liberal Arts</td>
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<tr>
<td>Women's and Gender Studies - BA</td>
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<td>Africana Studies Minor</td>
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<td>Comparative Cultural Studies International - Minor</td>
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<td>Communication Leadership and Conflict Management - Certificate</td>
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<td>593</td>
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<td>Zoology - BS</td>
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<td>Bioinformatics - Minor</td>
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<td>Chemistry - BA, Biological Chemistry or Medical, Dental, Pharmacy School Track</td>
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</tr>
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<td>Applied Mathematical Sciences - BS, Actuarial Emphasis</td>
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<td>Physics and Astronomy</td>
<td>634</td>
</tr>
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</tr>
<tr>
<td>Physics - BS</td>
<td>638</td>
</tr>
<tr>
<td>Astrophysics - Minor</td>
<td>639</td>
</tr>
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<td>Physics - Minor</td>
<td>639</td>
</tr>
<tr>
<td>Statistics</td>
<td>639</td>
</tr>
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<td>Statistics - BS</td>
<td>640</td>
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<tr>
<td>Statistics - Minor</td>
<td>642</td>
</tr>
</tbody>
</table>

**University Studies Programs** | 642 |

**College of Veterinary Medicine and Biomedical Sciences** | 646 |
| Biomedical Sciences - BS | 647 |
| Biomedical Sciences - Minor | 650 |
| International Certificate in Cultural Competency and Communications in Spanish | 651 |
| Small Animal Clinical Sciences | 651 |
| Veterinary Integrative Biosciences | 651 |
| Veterinary Large Animal Clinical Sciences | 651 |
| Veterinary Pathobiology | 651 |
| Veterinary Physiology and Pharmacology | 653 |
| Biomedical Research and Development - Certificate | 654 |
| University Studies Programs | 654 |
| University Studies - BS, Biomedical Sciences Concentration | 654 |

**School of Military Science** | 657 |
| Aerospace Studies | 657 |
| Military Science | 658 |
| Naval Science | 658 |
| Military Studies - Minor | 660 |
| Leadership Study and Development - Certificate | 661 |

**Texas A&M University Galveston Campus** | 662 |
<p>| Liberal Studies | 664 |
| Maritime Studies - BA | 666 |
| University Studies - BS, Marine Environmental Law and Policy Concentration | 667 |
| University Studies - BS, Maritime Public Policy and Communication Concentration | 668 |
| University Studies - BS, Tourism and Coastal Community Development Concentration | 669 |
| Diving Technology and Methods - Minor | 669 |
| Maritime Studies - Minor | 670 |
| Marine Biology | 670 |
| Marine Biology - BS | 671 |
| Marine Biology - BS, License Option | 672 |
| Marine Fisheries - BS | 674 |
| Marine Biology - Minor | 675 |
| Marine Engineering Technology | 675 |</p>
<table>
<thead>
<tr>
<th>Code</th>
<th>Department</th>
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<td>TAMUG Study Abroad</td>
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<td>Indust &amp; Systems Engr</td>
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<td>Journalism</td>
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<td>Latino/Mex Amer Studies</td>
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<td>Maritime Administration</td>
<td>868</td>
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<td>Marine Biology</td>
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<td>876</td>
</tr>
<tr>
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<td>Marine Science</td>
<td>877</td>
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<tr>
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<td>Marine Transportation</td>
<td>880</td>
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<td>MASC</td>
<td>Integrated Math &amp; Sci</td>
<td>882</td>
</tr>
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<td>MASE</td>
<td>Maritime Systems Engr</td>
<td>883</td>
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<td>Maritime Studies</td>
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</tr>
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<td>Meteorology</td>
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<td>Marketing</td>
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<td>Mfg &amp; Mech Engr Tech</td>
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<td>928</td>
</tr>
<tr>
<td>PHLT</td>
<td>Public Health</td>
<td>931</td>
</tr>
<tr>
<td>PHYS</td>
<td>Physics</td>
<td>933</td>
</tr>
<tr>
<td>PLPA</td>
<td>Plant Pathology</td>
<td>936</td>
</tr>
<tr>
<td>POLS</td>
<td>Political Science</td>
<td>936</td>
</tr>
<tr>
<td>PORT</td>
<td>Portuguese</td>
<td>941</td>
</tr>
<tr>
<td>POSC</td>
<td>Poultry Science</td>
<td>941</td>
</tr>
<tr>
<td>PSYC</td>
<td>Psychology</td>
<td>943</td>
</tr>
<tr>
<td>RDNG</td>
<td>Reading</td>
<td>946</td>
</tr>
<tr>
<td>RELS</td>
<td>Religious Studies</td>
<td>947</td>
</tr>
</tbody>
</table>
TEXAS A&M CATALOGS

Purpose of Catalogs
The Undergraduate and Graduate and Professional catalogs provide information about the academic programs of Texas A&M University to students, prospective students, faculty and staff of the University. Included is information concerning admissions, academic regulations and requirements, services available to students, academic offerings and a list of the administrative officers and faculty of the University. While every effort has been made to make this catalog as complete and accurate as possible, changes may occur at any time in requirements, deadlines, fees, curricula and courses listed in these catalogs.

Students should refer to Howdy, for course offerings in any given semester. For administrative reasons, because of insufficient enrollment or because of limited resources, any given course might not be offered in the announced semester.

This catalog was prepared in advance of its effective date; therefore, the course descriptions may vary from actual course content. The provisions of the catalogs do not constitute a contract, express or implied, between any applicant, student, faculty or staff member of Texas A&M University or The Texas A&M University System. These catalogs are for informational purposes only. The University reserves the right to change or alter any statement herein without prior notice. Neither catalog should be interpreted to allow a student who begins his or her education under either catalog to continue the program under the provisions in that catalog.

Accreditation
Texas A&M University is accredited by the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30030-8009, 404-679-4501, to award degrees at the bachelors', masters', doctoral and professional levels.

College of Agriculture and Life Sciences
Agricultural Systems Management curriculum is recognized by the American Society of Agricultural and Biological Engineers (ASABE) (http://www.asabe.org).

Dietetic Program in Dietetics is accredited by the Commission on Accreditation for Dietetics Education (https://www.cdead.org).

Forestry curriculum is accredited by the Society of American Foresters (SAF) (http://www.eforester.org).

Food Science and Technology curriculum is approved by the Institute of Food Technologists (IFT) (https://www.ift.org).

Forensics and Investigative Sciences program is accredited by the Forensic Science Education Programs Accreditation Commission (FEPAC) (http://fepac-edu.org).

Rangeland Ecology and Management curriculum is accredited by the Society for Range Management (SRM) (http://rangelands.org).

Recreation, Park and Tourism Sciences undergraduate curriculum is accredited by the National Recreation and Park Association (NRPA) (http://www.nrpa.org).

College of Architecture
Architecture is accredited by the National Architectural Accrediting Board (NAAB) (http://www.naab.org).

Construction Science curriculum is accredited by the American Council for Construction Education (ACCE) (http://www.acce-hq.org).

Landscape Architecture curriculum is accredited by the Landscape Architectural Accreditation Board (LAAB) (https://www.asla.org/accreditationlaab.aspx).

Urban and Regional Planning curriculum is accredited by the Planning Accreditation Board (PAB) (http://www.planningaccreditationboard.org).

May College of Business
The baccalaureate and master’s curricula in Mays Business School are accredited by the Association to Advance Collegiate Schools of Business (AACSB) (http://www.aacsb.edu).

College of Dentistry
Dentistry degree program is accredited by the Commission on Dental Accreditation (CODA) (http://www.ada.org).

College of Education and Human Development
Programs in professional education and degrees conferred by Texas A&M University are approved by the State Board of Educator Certification and the Texas Education Agency for certification purposes and are fully accredited by the National Council for Accreditation of Teacher Education (TEA) (http://tea.texas.gov/About_TEA/Leadership/StateBoard_for_Educator_Certification).

Counseling Psychology and School Psychology are accredited by the American Psychological Association (APA) (http://www.apa.org).

Athletic Training is accredited by the Commission on Accreditation of Athletic Training Education (CaATE) (http://caate.net).

College of Engineering
Undergraduate programs in Aerospace, Biological and Agricultural, Biological Systems, Biomedical, Chemical, Civil, Computer, Electrical, Industrial, Mechanical, Nuclear, Ocean, Petroleum and Radiological Health Engineering are accredited by the Engineering Accreditation Commission of ABET (http://main.abet.org/aps/AccreditedProgramsearch.aspx).

Electronic Systems Engineering Technology Program and the Manufacturing and Mechanical Engineering Technology Program are accredited by the Engineering Technology Accreditation Commission of ABET (http://main.abet.org/aps/AccreditedProgramsearch.aspx).

Computer Science Program is accredited by the Computing Accreditation Commission of ABET (http://main.abet.org/aps/AccreditedProgramsearch.aspx).

Bush School of Government and Public Service
The Master of Public Service and Administration degree in the Bush School of Government and Public Service is accredited by the Network of Schools of Public Policy, Affairs, and Administration (NASPAA) (https://accreditation.naspaa.org).
The School of Law
The curriculum in the School of Law is accredited by the American Bar Association (ABA) (http://www.americanbar.org/aba.html).

College of Liberal Arts
Clinical Psychology is accredited by the American Psychological Association (APA) (http://www.apa.org).

The English Language Institute is accredited by the Commission on English Language Program Accreditation (CEA) (http://cea-accredit.org).

College of Medicine
Medical Education degree program is accredited by the Liaison Committee on Medical Education (LCME) (http://lcme.org).

College of Nursing
Nursing degree program is accredited by the Commission on Collegiate Nursing Education (CCNE) (http://www.aacn.nche.edu).

Irma Lerma Rangel College of Pharmacology
The curriculum in the Irma Lerma Rangel College of Pharmacy is accredited by the Accreditation Council for Pharmacy Education (ACPE). (https://www.acpe-accredit.org)

School of Public Health
Public Health degree program is accredited by the Council on Education for Public Health (CEPH) (https://ceph.org).

College of Veterinary Medicine and Biomedical Sciences
Veterinary Medicine degree program is accredited by the American Veterinary Medical Association Council on Education (AVMA) (https://www.avma.org/Pages/home.aspx).

Other accrediting agencies which have approved programs offered at the University: American Chemical Society (ACS) (https://www.acs.org/content/acs/en.html).

Texas A&M University at Galveston
Offshore and Coastal Systems Engineering is accredited by the Engineering Accreditation Commission of ABET (http://main.abet.org/aps/Accreditedprogramsearch.aspx).

Marine Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET (http://main.abet.org/aps/Accreditedprogramsearch.aspx).
UNDERGRADUATE CATALOG

The Texas A&M University Undergraduate Catalog, published annually, provides information about the undergraduate programs of Texas A&M University to students, prospective students, and faculty and staff of the University. Included is information concerning requirements for admission, services available to students, course offerings and listings of the administrative officers.

Publication

Publication Statement

The Texas A&M University Undergraduate Catalog is published each spring and the provisions for this volume are applicable during the 2017-2018 academic year. A student who registers for the first time at the University during a summer session is subject to the degree requirements set forth in the catalog effective for the fall semester immediately following his or her initial enrollment.

Texas A&M University Undergraduate Catalog, Edition 140, is published online by the Office of the Registrar, Texas A&M University, College Station, Texas 77843-0200
# UNIVERSITY ACADEMIC CALENDAR

All dates are subject to change.

## 2017 Summer Term I

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 17</td>
<td>Graduation application opens for all students planning to graduate in August 2017.</td>
</tr>
<tr>
<td>May 26</td>
<td>Last day to register for Summer I term semester classes, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
</tr>
<tr>
<td>May 29</td>
<td>Memorial Day. Faculty and staff holiday.</td>
</tr>
<tr>
<td>May 30</td>
<td>First day of Summer I term classes.</td>
</tr>
<tr>
<td>June 2</td>
<td>Last day for adding/dropping courses for the Summer I term, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Summer I term official census date.</td>
</tr>
<tr>
<td>June 19</td>
<td>Last day for all students to drop courses with no penalty (Q-drop) for the Summer I term, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Last day to change Kinesiology 198/199 grade type for Summer I term, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Last day to officially withdraw from the University for the Summer I term, 5 p.m.</td>
</tr>
<tr>
<td>June 30</td>
<td>Last day of Summer I term classes.</td>
</tr>
<tr>
<td>July 3</td>
<td>Summer I term final examinations for all students.</td>
</tr>
<tr>
<td></td>
<td>No 10-week semester classes.</td>
</tr>
<tr>
<td></td>
<td>Last day to register for Summer II term classes. Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
</tr>
<tr>
<td>July 4</td>
<td>Independence Day. Faculty and staff holiday.</td>
</tr>
<tr>
<td>July 5</td>
<td>First day of Summer II term classes.</td>
</tr>
<tr>
<td>July 7</td>
<td>Summer II term final grades due to the Office of the Registrar, noon.</td>
</tr>
<tr>
<td></td>
<td>Grades will be available for viewing in Howdy after 5 p.m.</td>
</tr>
</tbody>
</table>

## 2017 Summer Term II

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 17</td>
<td>Graduation application opens for all students planning to graduate in August 2017.</td>
</tr>
<tr>
<td>July 3</td>
<td>Last day to register for the Summer II term semester classes, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
</tr>
<tr>
<td></td>
<td>No 10-week semester classes.</td>
</tr>
<tr>
<td>July 4</td>
<td>Independence Day. Faculty and staff holiday.</td>
</tr>
<tr>
<td>July 5</td>
<td>First day of Summer II term classes.</td>
</tr>
<tr>
<td>July 10</td>
<td>Last day for adding/dropping courses for the Summer II term, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Last day to officially withdraw from the University for the Summer II term, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Last day for degrees to be awarded in August without a late fee.</td>
</tr>
<tr>
<td></td>
<td>Summer II term official census date.</td>
</tr>
</tbody>
</table>

## 2017 10-Week Summer Semester

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 17</td>
<td>Graduation application opens for all students planning to graduate in August 2017.</td>
</tr>
<tr>
<td>May 26</td>
<td>Last day to register for 10-week semester classes, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
</tr>
<tr>
<td>May 29</td>
<td>Memorial Day. Faculty and Staff holiday.</td>
</tr>
<tr>
<td>May 30</td>
<td>First day of 10-week semester classes.</td>
</tr>
<tr>
<td>June 2</td>
<td>Last day for adding/dropping courses for the 10-week semester, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>10-week official census date.</td>
</tr>
<tr>
<td>July 3</td>
<td>No 10-week semester classes.</td>
</tr>
<tr>
<td>July 4</td>
<td>Independence Day. Faculty and staff holiday.</td>
</tr>
<tr>
<td>July 10</td>
<td>Last day to apply for degrees to be awarded in August without a late fee.</td>
</tr>
<tr>
<td>July 19</td>
<td>Last day for all students to drop courses with no penalty (Q-drop) for the 10-week semester, 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Last day to officially withdraw from the University for the 10-week semester, 5 p.m.</td>
</tr>
<tr>
<td>August 7</td>
<td>Last day of 10-week semester classes.</td>
</tr>
<tr>
<td>August 8-9</td>
<td>10-week semester final examinations for all students.</td>
</tr>
<tr>
<td>August 10</td>
<td>Grades for degree candidates due to Office of the Registrar, noon.</td>
</tr>
<tr>
<td></td>
<td>Grades will be available for viewing in Howdy after 10 p.m.</td>
</tr>
<tr>
<td>August 11</td>
<td>Commencement and Commissioning.</td>
</tr>
<tr>
<td></td>
<td>Last day for August undergraduate degree candidates to apply for Tuition Rebate in Howdy, 5 p.m.</td>
</tr>
</tbody>
</table>
### University Academic Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 12</td>
<td>Commencement.</td>
</tr>
<tr>
<td>August 14</td>
<td>Final grades for 10-week semester due in Office of the Registrar, noon. Grades will be available for viewing in Howdy after 5 p.m.</td>
</tr>
</tbody>
</table>

## 2017 Fall Semester

### Date Event

| August 16  | Graduation application opens for all students planning to graduate in December 2017. |
| August 25  | Last day to register for fall semester classes, 5 p.m. Refer to http://finance.tamu.edu/sbs for tuition and fee due dates. |
| August 30* | First day of fall semester classes. |
| September 5* | Last day for adding/dropping courses for the fall semester, 5 p.m. |
| September 14* | Fall official census date. |
| September 29 | Last day to apply for degrees to be awarded in December without a late fee. |
| September 30 | Undergraduate Degree Plan approval deadline. |
| October 16 | Mid-semester grades due to Office of the Registrar, noon. |
| November 9 - 29 | Preregistration for 2018 spring semester. |
| November 17 | Last day for all students to drop courses with no penalty (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type for Fall 2017, 5 p.m. Last day to officially withdraw from the University, 5 p.m. |
| November 18 | Bonfire 1999 Remembrance Day. |
| November 22 | Reading day, no classes. |
| November 23-24 | Thanksgiving holiday. Faculty and staff holiday. |
| December 4 | Redefined day, students attend their Friday classes. Does not apply to programs offered by the College of Nursing. Pursuant to Student Rule 8.3, no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes. |
| December 5 | Redefined day, students attend their Thursday classes. Does not apply to programs offered by the College of Nursing. Pursuant to Student Rule 8.3, no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes. |
| December 6 | Last day of fall semester classes. Pursuant to Student Rule 8.3, no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes. Last day to apply for all degrees to be awarded in December. |
| December 7 | Reading day, no classes. |
| December 8, 11-13 | Fall semester final examinations for all students. |
| December 14 | Grades for degree candidates due to the Office of the Registrar, 6 p.m. Grades will be available for viewing in Howdy after 10 p.m. |
| December 25-January 1 | Faculty and Staff holiday. |

* Dates adjusted to accommodate emergency closure for Hurricane Harvey.

## 2018 Spring Semester

### Date Event

| January 3 | Graduation application opens for all students planning to graduate in May 2018. |
| January 12 | Last day to register for spring semester classes, 5 p.m. Refer to http://finance.tamu.edu/sbs for tuition and fee due dates. |
| January 15 | Martin Luther King Jr. Day. Faculty and Staff holiday. |
| January 16 | First day of spring semester classes. |
| January 22 | Last day for adding/dropping courses for the spring semester, 5 p.m. |
| January 31 | Spring official census date. |
| February 16 | Last day to apply for degrees to be awarded in May without a late fee. |
| March 5 | Mid-semester grades due to Office of the Registrar, noon. |
| March 12-16 | Spring Break. |
| March 14-16 | Faculty and Staff holiday. |
| March 30 | Reading day, no classes. Does not apply to programs offered by the College of Nursing. |
| April 5-20 | Preregistration for 2018 Summer I term, Summer II term, 10-week summer semester and fall semester. |
| April 17 | Last day for all students to drop courses with no penalty (Q-drop), 5 p.m. Last day to change Kinesiology 198/199 grade type for Spring 2018, 5 p.m. Last day to officially withdraw from the University, 5 p.m. |
| April 21 | Muster. Campus ceremony. |
| April 30 | Pursuant to Student Rule 8.3, no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes. |
| May 1 | Last day of spring semester classes. Pursuant to Student Rule 8.3, no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes. Last day to apply for all degrees to be awarded in May. Redefined day, students attend their Friday classes. Does not apply to programs offered by the College of Nursing. Pursuant to Student Rule 8.3, no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes. |
May 2  | Reading days, no classes.
May 3-4, 7-8  | Spring semester final examinations for all students.
May 9  | Grades for degree candidates due to Office of the Registrar, 6 p.m.
        | Grades will be available for viewing in Howdy after 10 p.m.
May 10-12  | Commencement and Commissioning.
May 11  | Last day for May undergraduate degree candidates to apply for Tuition Rebate in Howdy, 5 p.m.
May 14  | Final grades for all students due in the Office of the Registrar, noon.
        | Grades will be available for viewing in Howdy after 5 p.m.

### 2018 Summer Term I

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>May 16</td>
<td>Graduation application opens for all students planning to graduate in August 2018.</td>
</tr>
<tr>
<td>May 25</td>
<td>Last day to register for Summer I term classes, 5 p.m. Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
</tr>
<tr>
<td>May 28</td>
<td>Memorial Day. Faculty and Staff holiday.</td>
</tr>
<tr>
<td>May 29</td>
<td>First day of Summer I term classes.</td>
</tr>
<tr>
<td>June 1</td>
<td>Last day for adding/dropping courses for the Summer I term, 5 p.m.</td>
</tr>
</tbody>
</table>
<pre><code>    | Summer I term official census date.                                  |
</code></pre>
<p>| June 18  | Last day for all students to drop courses with no penalty (Q-drop) for the Summer I term, 5 p.m. |
| Last day to change Kinesiology 198/199 grade type for the Summer I term, 5 p.m. |
| Last day to officially withdraw from the University for the Summer I term, 5 p.m. |
| June 29  | Last day of Summer I term classes.                                   |
| July 2   | Summer I term final examinations. No 10-week semester classes.       |
| Last day to register for Summer II term classes. Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates. |
| July 3   | First day of Summer II term classes.                                 |
| July 4   | Independence Day. Faculty and staff holiday.                        |
| July 6   | Summer I term final grades due to the Office of the Registrar, noon. |
| Grades will be available for viewing in Howdy after 5 p.m.           |
| July 9   | Last day to apply for degrees to be awarded in August without a late fee. |</p>

### 2018 Summer Term II

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 16</td>
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<tr>
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<td>Last day to register for 10-week semester classes, 5 p.m. Refer to <a href="http://finance.tamu.edu/sbs">http://finance.tamu.edu/sbs</a> for tuition and fee due dates.</td>
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<tr>
<td>May 28</td>
<td>Memorial Day. Faculty and Staff holiday.</td>
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<tr>
<td>May 29</td>
<td>First day of 10-week semester classes.</td>
</tr>
<tr>
<td>June 1</td>
<td>Last day for adding/dropping courses for the 10-week semester, 5 p.m.</td>
</tr>
</tbody>
</table>
<pre><code>    | 10-week official census date.                                        |
</code></pre>
<p>| July 2   | No 10-week semester classes.                                         |
| July 4   | Independence Day. Faculty and staff holiday.                         |
| July 9   | Last day to apply for degrees to be awarded in August without a late fee. |
| July 18  | Last day for all students to drop courses with no penalty (Q-drop) for the 10-week semester, 5 p.m. |
| Last day to officially withdraw from the University for the 10-week semester, 5 p.m. |
| August 6 | Last day of 10-week semester classes.                                |
|         | Last day to apply for all degrees awarded in August.                 |</p>
August 8-10 10-week semester final examinations for all students.

August 9 Grades for degree candidates from departments due to Office of the Registrar, noon.
Grades will be available for viewing in Howdy after 10 p.m.

August 10 Last day for August undergraduate degree candidates to apply for Tuition Rebate in Howdy, 5 p.m.

August 10-11 Commencement and Commissioning.

August 13 Final grades for 10-week semester due to Office of the Registrar, noon.
Grades will be available for viewing in Howdy after 5 p.m.

McAllen Higher Education Center
2017 Fall Semester

August 16 Graduation application opens for all students planning to graduate in December 2017.

August 25 Last day to register for fall semester classes, 5 p.m.
Refer to http://finance.tamu.edu/sbs for tuition and fee due dates.

August 28 First day of fall semester classes.

September 1 Last day for adding/dropping courses for fall semester, 5 p.m.

September 4 Labor Day, no classes.

September 13 Fall official census date.

September 22 Reading day, no classes.

September 29 Last day to apply for all degrees to be awarded in December without a late fee.

September 30 Undergraduate degree plan approval deadline.

October 16 Mid-semester grades due to the Office of the Registrar, noon.

November 9-29 Preregistration for 2018 spring semester.

November 18 Bonfire 1999 Remembrance Day.

November 21 Last day for all students to drop courses with no penalty (Q-drop), 5 p.m.
Last day to change Kinesiology 198/199 grade type for Fall 2017, 5 p.m.
Last day to officially withdraw from the University, 5 p.m.

November 22 Reading day, no classes.

November 23-25 Thanksgiving holiday.

December 4 Pursuant to Student Rule 8.3 (http://student-rules.tamu.edu/rule08), no regular course examinations (except for laboratory and one-hour courses) shall be given during the 15th week of classes.

December 5 Redefined day, students attend their Friday classes.

December 6 Last day to apply for all degrees to be awarded in December.

December 9 Last day of fall semester classes.

December 11 Reading day.

December 12-15 Fall semester final examinations.

December 15 Commencement and Commissioning.

December 18 Last day for December undergraduate degree candidates to apply for Tuition Rebate in Howdy, 5 p.m.

December 19 Final grades due to the Office of the Registrar, noon.

2018 Spring Semester

January 3 Graduation application opens for all students planning to graduate in May 2018.

January 12 Last day to register for spring semester classes, 5 p.m.
Refer to http://finance.tamu.edu/sbs for tuition and fee due dates.

January 15 Martin Luther King Jr. Day. Faculty and Staff holiday.

January 16 First day of spring semester classes.

January 22 Last day for adding/dropping courses for the spring semester, 5 p.m.

January 31 Spring official census date.

February 9 Reading day, no classes.

February 16 Last day to apply for degrees to be awarded in May without a late fee.

February 24 No laboratory classes shall be held.

March 5 Mid-semester grades due to the Office of the Registrar, noon.

March 12-16 Spring Break.

March 15-16 Faculty and Staff holiday.

March 29-30 Reading days, no classes.

April 5-20 Preregistration for 2018 first term, second term, 10-week summer semester and fall semester.

April 19 Last day for all students to drop courses with no penalty (Q-drop), 5 p.m.
Last day to change Kinesiology 198/199 grade type for Spring 2018, 5 p.m.
Last day to officially withdraw from the University, 5 p.m.

April 21 Aggie Muster.

April 30 Pursuant to Student Rule 8.3 (http://student-rules.tamu.edu/rule08), no regular course examinations (except for laboratory and one-hour courses) shall be given the 15th week of classes.

May 1 Redefined day, students attend their Friday classes.
Last day to apply for all degrees to be awarded in May.

May 2 Reading days, no classes.

May 5 Last day of spring semester classes.

May 7-10 Spring semester final examinations.

May 14 Final grades for all students due to the Office of the Registrar, noon.
BOARD OF REGENTS AND
ADMINISTRATIVE OFFICERS

Board of Regents
Cliff Thomas, Chairman - Victoria
Elaine Mendoza, Vice Chairman - San Antonio
Phil Adams - Bryan/College Station
Robert L. “Bob” Albritton - Fort Worth
Anthony G. Buzbee - Houston
Morris E. Foster - Austin
Tim Leach - Midland
William “Bill” Mahomes, Jr. - Dallas
Charles W. Schwartz - Houston
Stephanie Y. Martinez (Student Regent) - Laredo
***
Jackie Bell - Assistant to the Board of Regents
***
Chancellor - John Sharp

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President - Michael K. Young
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Dean, College of Veterinary Medicine and Biomedical Sciences - Eleanor M. Green
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Associate Provost for Undergraduate Studies - Ann L. Kenimer
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Associate Vice President for Academic Services - Joseph P. Pettibon II
Associate Vice President for External Relations - Chad E. Wootton
Associate Vice President for Administration and Academic Affairs - Deena J. McConnell
GENERAL INFORMATION

The following types of information can be found within the General Information section of the catalog:

History and Development (p. 20) Mission Statement; History and Development

University Core Curriculum (p. 21)

Student Learning Outcomes (p. 26)

Degree Information (p. 27) Which Catalog to Follow; Degrees Offered; Requirements for a Baccalaureate Degree; Undergraduate Minor Programs; Two Degrees; Baccalaureate Degree Option for Students Granted Early Admission to Medical/Professional Programs; Graduation with Honors; Graduation Application, Diploma and Commencement; Tuition Charged for Excess Credit Hours; Programs offered via Distance Education; Undergraduate Minor Programs; Undergraduate Certificate Programs; and International and Cultural Diversity Requirements

Admission (p. 45) Application Information; Items Necessary to Complete an Application File; Notification of Application Status; Required Coursework; State of Texas Uniform Admission Policy; Additional Information for Freshman Applicants; Freshman Admissions; Information for all Freshman Applicants; Notice of Admission Decision; Suspected Fraudulent Admission Applications; Transfer Admissions; Notification of Admission Decisions; Transfer Course Credit Policies; International Admission Criteria; Admission Criteria for Other Application Types; Academic Fresh Start Policy; Entry to a Major – College of Engineering; Upper-Level Entry into Colleges of Architecture, Business and Veterinary Medicine and Biomedical Sciences—Biomedical Science; Entry into the College of Dentistry and the College of Nursing; Course Credit; Graduate Admission; Texas A&M University Galveston campus

Registration and Academic Status (p. 74) Full-Time Student; Undergraduates Registering for Graduate Courses; VA Benefits; Maximum Schedule; Classification; Academic Status

Grading System (p. 76) Repetition of a Course to Improve Grades; I and X Grades; Q-Drop and Add and Drop; Satisfactory/Unsatisfactory; Semester Credit Hour; Grade Point Average (GPA); Classification; Grade Reports

Housing (p. 78) Adult, Graduate and Off Campus Student Services; On-Campus Housing; University Apartments (The Gardens)

Orientation (p. 79) Aggie Honor System Office; ExCEI Program; Fish Camp; Howdy Camp; New Student Conferences; Transfer Camp (T-Camp)

Services for Students (p. 80) Academic Advising; Academic Success Center; The Association of Former Students; Career Center; Consensual Language, Education, Awareness and Relationships (CLEAR); Disability Services; Gay, Lesbian, Bisexual, Transgender (GLBT) Resource Center; George Bush Presidential Library and Museum; Health Promotion; International Student Services; Professional School Advising; Student Conduct Office; Student Counseling Service; Student Health Services; Student Legal; Technology Resources; University Libraries; University Police; University Writing Center; Veteran Resource and Support Center (VRSC); Veteran Services Office (Scholarships & Financial Aid); Women’s Resource Center (WRC)

Campus Life (p. 84) The Corps Experience; Department of Multicultural Services; Office of Fraternity and Sorority Life; Intercollegiate Athletics; Memorial Student Center (MSC); Musical Activities; Recreational Sports; Speech and Debate Team; Student Activities; Student Government (SGA); Student Life; Student Life Studies; Student Media; University Art Galleries; University Center and Special Events (UCEN); Vice President for Student Affairs

History and Development

Mission Statement

Texas A&M University (Texas A&M) is dedicated to the discovery, development, communication and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

History and Development

Texas A&M University, the state’s first public institution of higher education, opened for classes in 1876. It is now one of a select few institutions in the nation to hold land grant, sea grant and space grant designations. It is also one of the few universities to host a presidential library. The George Bush Presidential Library and Museum opened in 1997 on a 90-acre tract of land on the west side of campus. The University owes its origin to the Morrill Act approved by the Congress on July 2, 1862. This act provided for donation of public land to the states. The land was to be sold at auction, and the proceeds were set aside in a perpetual fund. The act directed that interest from this fund be used to support a college whose “leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts... in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”

By resolution of the Legislature of the State of Texas in November 1866, Texas agreed to provide for a college under the terms of the Morrill Act, but no such institution was organized until the establishment of the Agricultural and Mechanical College of Texas by act of the Twelfth Texas Legislature on April 17, 1871. The same act appropriated $75,000 for the erection of buildings and bound the state to defray all expenses of the college exceeding the annual interest from the endowment. Proceeds from the sale of the 180,000 acres of land scrip received under the Land Grant College Act were invested in $174,000 of gold frontier defense bonds to Texas, forming a perpetual endowment for the institution. A commission created to locate the institution accepted the offer of 2,416 acres of land from the citizens of Brazos County in 1871, and instruction began in 1876.
As the State of Texas grew, so did its land grant institution. Texas A&M now has a physical plant valued at more than $1 billion. The campus in College Station includes 5,200 acres and is one of the largest campuses of any major institution of higher education in the nation. The University also operates branch campuses at Galveston and Doha, Qatar, with the latter operating at no expense to the State of Texas. Additionally, the University operates the Soltis Center for Research and Education in San Isidro de Peñas Blancas, Costa Rica. The University also supports global activities for students at the Santa Chiara Study Center in Castiglion Fiorentino, Arezzo, Italy, and maintains an office in Mexico City.

In keeping with the diversified and expanded character of the institution, the 58th Legislature of Texas, on August 23, 1963, changed the name of the Agricultural and Mechanical College of Texas to Texas A&M University.

On September 17, 1971, the designation "sea grant college" was assigned to Texas A&M University in recognition of its achievements in oceanographic and marine resources development. Texas A&M was one of the first four institutions nationwide to achieve this distinction. Patterned after the century-old land grant idea, sea grant colleges are federal-state partnerships for furthering marine work through practical research, education and advisory services. The designation clearly establishes the University’s leadership relative to marine affairs of the state.

Texas A&M added a third special designation to its credentials on August 31, 1989, when it was named a “space grant college.” This new designation, bestowed by the National Aeronautics and Space Administration, came to the University based on its continuing commitment to space research and its participation in the Texas Space Grant Consortium, a group of 35 institutions that includes universities, industrial organizations, non-profit organizations and government agencies within Texas under the leadership of Texas A&M University, The University of Texas at Austin and the University of Houston.

In addition to its traditional strengths in agriculture and engineering, Texas A&M has established itself as a leader in such newer technological areas as the space, nuclear, computer, biotechnological, oceanographic and marine resources fields. It also has placed added emphasis on the arts and sciences and business and continues to enhance its prominent role in these fields.

A mandatory military component was a part of the Land Grant designation until the 1950s, and the Corps of Cadets has played an important part in the history and development of Texas A&M. Even though membership in the Corps of Cadets became voluntary in 1965, Texas A&M historically has produced more officers than any other institution in the nation with the exception of the service academies. The University is one of only three institutions with a full-time corps of cadets including ROTC programs leading to commissions in all branches of service including ROTC programs leading to commissions in all branches of service — Army, Air Force, Navy, Marine Corps and Coast Guard.

Texas A&M offers a variety of programs in both undergraduate and graduate studies through its academic colleges and schools supported by the Texas A&M University Libraries — Agriculture and Life Sciences, Architecture, The Bush School of Government and Public Service, Mays Business School, Education and Human Development, College of Engineering, Geosciences, Liberal Arts, Science, and Veterinary Medicine and Biomedical Sciences. Texas A&M University Galveston campus is the marine and maritime branch campus of Texas A&M University, and Texas A&M University Qatar campus offers degrees in engineering. In addition, Texas A&M’s extensive research efforts in all fields, in conjunction with agricultural and engineering experiment stations, resulted in annual expenditures of approximately $630 million in 2009, which consistently rank in the top tier of research institutions by the National Science Foundation.

Classified by the Carnegie Foundation as a Research University (very high research activity), Texas A&M embraces its mission of the advancement of knowledge and human achievement in all its dimensions. The research mission is a key to advancing economic development in both public and private sectors. Integration of research with teaching prepares students to compete in a knowledge-based society and to continue developing their own creativity, learning, and skills beyond graduation.

In 2001, Texas A&M University was admitted to the Association of American Universities (AAU), the prestigious organization founded in 1900 that restricts its ranks to the nation’s premier public and private institutions of higher learning. In 2004, the Kappa of Texas Chapter of Phi Beta Kappa was installed at Texas A&M University.

University Core Curriculum

The Texas A&M Core Curriculum, in compliance with the Texas Core Curriculum, provides students with a foundation of knowledge of human cultures and the physical and natural world, develops principles of personal and social responsibility for living in a diverse world, and advances intellectual and practical skills that are essential for all learning. The Core Curriculum enhances the individual degree program and university graduation requirements, and all three areas must be met by every student.

Given the rapid evolution of necessary knowledge and skills and the need to take into account global, national, state, and local cultures, the core curriculum ensures that students will develop the essential knowledge and skills they need to be successful in college, a career, in their communities, and in life. The core curriculum acts to enrich and broaden the University’s tradition of providing thorough preparation in each student’s academic major and preparing students for a lifetime of learning.

The University Core Curriculum requirements are described in the section that follows. These requirements must be met by every student entering Texas A&M University on or after the 2014 fall semester. Students entering earlier will be guided by the core curriculum in the catalog upon which they entered the university. Individual degree programs may require that specific courses from the core curriculum be used to satisfy core curriculum requirements. Please check with individual program advisors for details. Students transferring course credit to satisfy the Core Curriculum requirements should refer to the Texas Common Course Numbering System (p. 1115).

The core curriculum focuses on the development of six skills that have been shown to be effective in preparing students for the job market and their role in a diverse world and democratic society.

- Critical Thinking Skills — to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- Communication Skills — to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- Empirical and Quantitative Skills — to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
• **Teamwork** – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

• **Personal Responsibility** – to include the ability to connect choices, actions and consequences to ethical decision-making.

• **Social Responsibility** – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.

Students develop and practice these skills in the context of 42 semester credit hours assigned to eight Foundational Component Areas, each made up of a selection of courses that meet the definition provided by the Texas Core Curriculum. For additional information, please reference http://core.tamu.edu.

### Communication - 6 SCH

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>THAR 407</td>
<td>Performing Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses in this category focus on developing ideas and expressing them clearly, considering the effective of the message, fostering understanding, and building the skills needed to communicate persuasively. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages appropriate to the subject, occasion, and audience. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, team work, and personal responsibility.

### Mathematics – 6 SCH

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Functions, Trigonometry and Linear Systems</td>
<td>4</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 167</td>
<td>Explorations in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MATH 172</td>
<td>Calculus</td>
<td>4</td>
</tr>
</tbody>
</table>

PHIL 240 Introduction to Logic 3

Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experiences. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, and empirical and quantitative.

### Life and Physical Sciences – 9 SCH

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 107</td>
<td>General Animal Science</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 225</td>
<td>Introduction to Biological Anthropology</td>
<td>3</td>
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<tr>
<td>ANTH 226</td>
<td>Introduction to Biological Anthropology Laboratory</td>
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</tr>
<tr>
<td>ASTR 101</td>
<td>Basic Astronomy</td>
<td>3</td>
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<tr>
<td>ASTR 102</td>
<td>Observational Astronomy</td>
<td>1</td>
</tr>
<tr>
<td>ASTR 103</td>
<td>Introduction to Stars and Exoplanets</td>
<td>3</td>
</tr>
<tr>
<td>ASTR 104</td>
<td>Introduction to Galaxies and Cosmology</td>
<td>3</td>
</tr>
<tr>
<td>ASTR 109/PHYS 109</td>
<td>Big Bang and Black Holes</td>
<td>3</td>
</tr>
<tr>
<td>ASTR 111</td>
<td>Overview of Modern Astronomy</td>
<td>4</td>
</tr>
<tr>
<td>ASTR 119/PHYS 119</td>
<td>Big Bang and Black Holes: Laboratory Methods</td>
<td>1</td>
</tr>
<tr>
<td>ATM 201</td>
<td>Weather and Climate</td>
<td>3</td>
</tr>
<tr>
<td>ATM 202</td>
<td>Weather and Climate Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
<td>3</td>
</tr>
<tr>
<td>BESC 204</td>
<td>Molds and Mushrooms: The Impact of Fungi on Society and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 107</td>
<td>Zoology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
<td>4</td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 106</td>
<td>Molecular Science for Citizens</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Fundamentals of Chemistry Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 116</td>
<td>Molecular Science for Citizens Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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</tr>
<tr>
<td>ENGR 101</td>
<td>Energy: Resources, Utilization and Importance to Society</td>
<td>4</td>
</tr>
<tr>
<td>ENTO 322</td>
<td>Insects and Human Society</td>
<td>3</td>
</tr>
</tbody>
</table>
Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, empirical and quantitative, and team work.

**Language, Philosophy and Culture – 3 SCH**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>AFST 204/ ENGL 204</td>
<td>Introduction to African-American Literature</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AFST 345/ HIST 345</td>
<td>Modern Africa</td>
<td>3</td>
<td></td>
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<tr>
<td>ANTH 204</td>
<td>The Prehistoric World</td>
<td>3</td>
<td></td>
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<tr>
<td>ANTH 205</td>
<td>Peoples and Cultures of the World</td>
<td>3</td>
<td></td>
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<tr>
<td>ANTH 210</td>
<td>Social and Cultural Anthropology</td>
<td>3</td>
<td></td>
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<tr>
<td>ANTH 316</td>
<td>Nautical Archaeology</td>
<td>3</td>
<td></td>
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<tr>
<td>ANTH 317/ RELS 317</td>
<td>Introduction to Biblical Archaeology</td>
<td>3</td>
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<tr>
<td>ARAB 201</td>
<td>Intermediate Arabic I</td>
<td>3</td>
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<td>ARAB 202</td>
<td>Intermediate Arabic II</td>
<td>3</td>
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<tr>
<td>ARCH 213</td>
<td>Sustainable Architecture</td>
<td>3</td>
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<tr>
<td>ARCH 346</td>
<td>Architecture, Heritage and Culture</td>
<td>3</td>
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<td>CARC 331</td>
<td>Field Studies in Design Philosophy</td>
<td>3</td>
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<tr>
<td>CHIN 201</td>
<td>Intermediate Chinese I</td>
<td>3</td>
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<tr>
<td>CHIN 202</td>
<td>Intermediate Chinese II</td>
<td>3</td>
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<tr>
<td>CLAS 220</td>
<td>History of Christianity: Origins to the Reformation</td>
<td>3</td>
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<td>CLAS 221</td>
<td>Intermediate Latin I</td>
<td>3</td>
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<td>CLAS 222</td>
<td>Intermediate Latin II</td>
<td>3</td>
<td></td>
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<tr>
<td>CLAS 250</td>
<td>Greek and Roman Civilization</td>
<td>3</td>
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<tr>
<td>CLAS 251/ RELS 251</td>
<td>Classical Mythology</td>
<td>3</td>
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<td>CLAS 429/ HIST 429</td>
<td>The Roman Empire</td>
<td>3</td>
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<tr>
<td>COMM 301</td>
<td>Rhetoric in Western Thought</td>
<td>3</td>
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<td>COMM 327</td>
<td>American Oratory</td>
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<tr>
<td>ENGL 202</td>
<td>Environmental Literature</td>
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<tr>
<td>ENGL 204/ AFST 204</td>
<td>Introduction to African-American Literature</td>
<td>3</td>
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<tr>
<td>ENGL 206</td>
<td>Twenty-first Century Literature and Culture</td>
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<td>ENGL 207</td>
<td>Human Thinking and Digital Culture</td>
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<td>ENGL 221/ MODL 221</td>
<td>World Literature</td>
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<tr>
<td>ENGL 222/ MODL 222</td>
<td>World Literature</td>
<td>3</td>
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<td>ENGL 227</td>
<td>American Literature: The Beginnings to Civil War</td>
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<td>ENGL 228</td>
<td>American Literature: Civil War to Present</td>
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<tr>
<td>ENGL 231</td>
<td>Survey of English Literature I</td>
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<td>ENGL 232</td>
<td>Survey of English Literature II</td>
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<tr>
<td>ENGL 253</td>
<td>Introduction to Cultural Studies and Popular Culture</td>
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<td>ENGL 306</td>
<td>Transnational Literature and Culture</td>
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<td>ENGL 330</td>
<td>Arthurian Literature</td>
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<td>ENGL 333/ WGST 333</td>
<td>Gay and Lesbian Literature</td>
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<td>ENGL 334</td>
<td>Science Fiction Present and Past</td>
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<td>Literature of the Sea</td>
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<td>ENGL 338</td>
<td>American Ethnic Literature</td>
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<td>Latino/a Literature</td>
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<td>ENGL 365/ RELS 360</td>
<td>The Bible as Literature</td>
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<td>Women Writers</td>
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<td>ENGL 376</td>
<td>The American Novel Since 1900</td>
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<td>FSTC 300/NUTR 300</td>
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<td>GEOG 202</td>
<td>Geography of the Global Village</td>
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<td>HIST 102</td>
<td>Western Civilization Since 1660</td>
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<td>World History to 1500</td>
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<td>HIST 104</td>
<td>World History Since 1500</td>
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<td>HIST 210</td>
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<td>HIST 213</td>
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<td>HIST 214</td>
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<td>HIST 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<td>HIST 221/RELS 221</td>
<td>History of Islam</td>
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<td>HIST 234</td>
<td>European Military History</td>
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<td>HIST 242</td>
<td>United States Maritime History</td>
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<td>HIST 345/AFST 345</td>
<td>Modern Africa</td>
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<td>Rise of Islam, 600-1258</td>
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<td>The Roman Empire</td>
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<td>Contemporary Issues in the Middle East</td>
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<td>Music and the Human Experience</td>
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<td>MUSC 227</td>
<td>Popular Music of India</td>
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<td>Dance and World Cultures</td>
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<td>Dance and Identity in the United States</td>
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<td>PHIL 111</td>
<td>Contemporary Moral Issues</td>
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<td>PHIL 251</td>
<td>Introduction to Philosophy</td>
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<td>Ethics and Engineering</td>
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<td>RELS 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<tr>
<td>RELS 221/HIST 221</td>
<td>History of Islam</td>
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<td>Classical Mythology</td>
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<td>Contemplation in the Modern World</td>
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<td>RELS 317/ANTH 317</td>
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<td>RELS 347/HIST 347</td>
<td>Rise of Islam, 600-1258</td>
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<td>RELS 360/ENGL 365</td>
<td>The Bible as Literature</td>
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<td>SPAN 201</td>
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<td>SPMT 220</td>
<td>Olympic Studies</td>
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<td>THAR 155</td>
<td>History of Western Dress</td>
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<td>THAR 156</td>
<td>Dress, Culture and Society</td>
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<td>THAR 280</td>
<td>History of the Theatre I</td>
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<td>THAR 281</td>
<td>History of the Theatre II</td>
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<td>WGST 200</td>
<td>Introduction to Women’s and Gender Studies</td>
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<td>WGST 333/ENGL 333</td>
<td>Gay and Lesbian Literature</td>
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<td>WGST 374/ENGL 374</td>
<td>Women Writers</td>
<td>3</td>
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</tr>
</tbody>
</table>

Courses in this category focus on how ideas, values, beliefs, and other aspects of culture express and affect human experience. Courses involve the exploration of ideas that foster aesthetic and intellectual creation in order to understand the human condition across cultures. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, social responsibility, and personal responsibility.

**Creative Arts – 3 SCH**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit</th>
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<tbody>
<tr>
<td>AFST 327</td>
<td>Popular Musics in the African Diaspora</td>
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<tr>
<td>ANTH 324/MUSC 324</td>
<td>Music in World Cultures</td>
<td>3</td>
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<tr>
<td>ARCH 249</td>
<td>Survey of World Architecture History I</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 250</td>
<td>Survey of World Architecture History II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 350</td>
<td>History and Theory of Modern and Contemporary Architecture</td>
<td>3</td>
</tr>
</tbody>
</table>
Courses in this category focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, team work, and social responsibility.

**American History – 6 SCH**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>AFST 300/</td>
<td>Blacks in the United States, 1607-1877</td>
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</tr>
<tr>
<td>AFST 301/</td>
<td>Blacks in the United States Since 1877</td>
<td>3</td>
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<tr>
<td>HIST 105</td>
<td>History of the United States</td>
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<tr>
<td>HIST 106</td>
<td>History of the United States</td>
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<tr>
<td>HIST 226</td>
<td>History of Texas</td>
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<tr>
<td>HIST 230</td>
<td>American Military History, 1609 to Present</td>
<td>3</td>
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<tr>
<td>HIST 232</td>
<td>History of American Sea Power</td>
<td>3</td>
</tr>
<tr>
<td>HIST 258</td>
<td>American Indian History</td>
<td>3</td>
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<tr>
<td>HIST 300/</td>
<td>Blacks in the United States, 1607-1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 301/</td>
<td>Blacks in the United States Since 1877</td>
<td>3</td>
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</tbody>
</table>

Courses in this category focus on the consideration of past events and ideas relative to the United States, with the option of including Texas History for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, social responsibility, and personal responsibility.

**Government/Political Science – 6 SCH**

<table>
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<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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</tbody>
</table>

Courses in this category focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, social responsibility, and personal responsibility.

**Social and Behavioral Sciences – 3 SCH**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
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</table>
### Student Learning Outcomes

Student learning outcomes articulate the knowledge and skills we expect students to gain during their educational experiences. These learning outcomes ask students to connect their course- and degree-level learning to overall goals determined to be critically important to a university’s graduates as they make their way in the world after graduation and prepared to engage in learning for a lifetime.

First and foremost, of course, we expect students to have learned the material presented in their individual courses. From entry-level general education courses required of all undergraduates to capstone courses restricted to seniors in a major to specialized graduate seminars, by the time of graduation students are expected to have learned the material assigned in all of their courses. We call this “content knowledge.”

The broader institutional student learning outcomes ask students to connect the pieces of their education into a whole that synthesizes what they have learned. Students graduate not only knowing facts and understanding basic concepts but also demonstrating an ability to apply and explain those facts and concepts creatively in new situations. Students gain the skills and knowledge that allows them to thrive in a complex world.

### Baccalaureate

A student who graduates from Texas A&M University with a baccalaureate degree will have acquired the knowledge and skills necessary to:

**Master the depth of knowledge required for a degree**, including the ability to:

- Articulate disciplinary and interdisciplinary theories, concepts, principles, skills, and practices;
- Synthesize knowledge across courses and other experiences; and

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>Environmental and Natural Resource Economics</td>
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<td>ALEC 450</td>
<td>Global Social Justice Issues in Agriculture</td>
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<tr>
<td>ANTH 201</td>
<td>Introduction to Anthropology</td>
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<tr>
<td>ANTH 202</td>
<td>Introduction to Archaeology</td>
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<tr>
<td>ARCH 212</td>
<td>Social and Behavioral Factors in Design</td>
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<td>ARCH 458</td>
<td>Cultural and Ethical Considerations for Global Practice</td>
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<td>COMM 315</td>
<td>Interpersonal Communication</td>
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<td>COMM 320</td>
<td>Organizational Communication</td>
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<td>COMM 325</td>
<td>Persuasion</td>
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<td>COMM 335</td>
<td>Intercultural Communication</td>
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<td>COMM 365</td>
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<td>Principles of Economics</td>
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<td>Principles of Economics</td>
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<td>Child Development</td>
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<td>EPSY 321</td>
<td>Adolescent Development</td>
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<td>Introduction to Human Geography</td>
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<td>HLTH 236</td>
<td>Race, Ethnicity and Health</td>
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<td>HORT 335</td>
<td>Sociohorticulture</td>
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<td>INST 210</td>
<td>Understanding Special Populations</td>
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<td>INST 222</td>
<td>Foundations of Education in a Multicultural Society</td>
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<td>INST 301</td>
<td>Educational Psychology</td>
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<td>JOUR 102</td>
<td>American Mass Media</td>
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<td>International Communication</td>
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<td>MARS 210</td>
<td>Marine Geography</td>
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<td>PSYC 107</td>
<td>Introduction to Psychology</td>
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<tr>
<td>SOCI 205</td>
<td>Introduction to Sociology</td>
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<tr>
<td>SOCI 206</td>
<td>Global Social Trends</td>
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<td>SOCI 207/</td>
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<td>SOCI 210</td>
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<td>SOCI 211</td>
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<td>SOCI 212</td>
<td>Sociology of Popular Culture</td>
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<td>SOCI 217</td>
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<td>SOCI 304</td>
<td>Criminology</td>
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<td>Population and Society</td>
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<td>Military, War and Society</td>
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<td>SOCI 314</td>
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<td>SOCI 315/</td>
<td>The Marriage Institution</td>
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<td>SPMT 319</td>
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<td>Morality and Society</td>
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<td>SPMT 304</td>
<td>Sport Psychology Management and Practice</td>
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</table>

Courses in this category focus on the application of empirical and scientific methods that contribute to the understanding of what makes us human. Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the individual, society, and culture. The following skills will be addressed in the courses that comprise this area: critical thinking, communication, empirical and quantitative, and social responsibility.

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1. Applicable courses are listed in the Texas Higher Education Coordinating Board course inventory as meeting either the Mathematics or the Component Area Option Foundational Component Area.

2. Applicable courses are listed in the Texas Higher Education Coordinating Board course inventory as meeting either the Life and Physical Sciences or the Component Area Option Foundational Component Area.
• Apply knowledge from core curriculum courses, discipline-based courses, and other experiences in a range of contexts to solve problems and make decisions.

Demonstrate critical thinking, including the ability to:
• Evaluate, analyze, and integrate information from a variety of sources;
• Use appropriate strategies and tools to represent, analyze, and integrate information; and
• Develop critical, reasoned positions.

Communicate effectively, including the ability to:
• Demonstrate effective oral communication skills (which could include the use of languages such as American Sign language for those who do not communicate orally);
• Demonstrate effective writing skills;
• Demonstrate effective nonverbal communication skills (which could include appropriate use of performance, design, or representations such as maps, tables, and graphs);
• Listen actively and critically;
• Present work effectively to a range of audiences; and
• Effectively communicate original and creative ideas.

Practice personal and social responsibility, including the ability to:
• Practice ethical leadership;
• Recognize an ethical dilemma and apply rational decision-making in order to address it;
• Choose ethical courses of action in research and practice;
•Acknowledge and address the consequences of one’s own actions; and
• Engage in local and global civic activities.

Demonstrate social, cultural, and global competence, including the ability to:
• Live and work effectively in a diverse and global society;
• Articulate the value of a diverse and global perspective; and
• Recognize diverse economic, political, cultural, and religious opinions and practices.

Prepare to engage in lifelong learning, including the ability to:
• Exhibit the skills necessary to acquire, organize, reorganize, and interpret new knowledge;
• Show proficiency in current technologies and the ability to adapt to emerging technologies;
• Recognize and participate in activities that enhance wellness of body, mind, and spirit;
• Formulate a plan of personal goals for continued professional growth; and
• Demonstrate intellectual curiosity.

Work collaboratively, including the ability to:
• Participate effectively in teams;
• Consider different points of view; and
• Work with others to support a shared purpose or goal.

Degree Information
Which Catalog to Follow
In meeting the requirements for a baccalaureate degree, a student is expected to complete the course and hour requirements as outlined in the catalog in effect at the time he or she first enrolls at Texas A&M. Normally, a student will not be granted a degree based upon completion of the requirements set forth in a catalog more than seven years old. Before changing catalogs, the student must consult his or her academic advisor. A student changes catalogs by filing a written notification with his or her dean, or designee. It is incumbent on the student to verify that the change has been made. Texas A&M University Student Rules (including periodic revisions) is the governing document in case of conflict between this catalog and Texas A&M University Student Rules. It is the responsibility of the individual student to read this information carefully and to use it as a reference. Please refer to the Student Rules for this information.

Whereas each college must retain the flexibility to improve its curriculum, course offerings may be changed during the student’s education. If a course required under a previous catalog is no longer offered, a student eligible to graduate according to that catalog should consult his or her academic advisor or dean to identify another course that may be used to fulfill the requirement. Course adjustments in the degree program are permitted only with the approval of the dean through the department head or program director. Furthermore, the University reserves the right to make any changes in requirements it may consider necessary and desirable by due notice in the catalog.

Students are required to take the courses listed in a curriculum; however, the display of a curriculum does not in any way indicate the length of time required to finish degree requirements. Rather, this display is intended as a guide to indicate the preferred order for completion of degree requirements. Exceptions to certain requirements may be petitioned through the department head to the dean of the college.

Degrees Offered
The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:
• Bachelor of Arts (BA)
• Bachelor of Business Administration (BBA)
• Bachelor of Environmental Design (BED)
• Bachelor of Landscape Architecture (BLA)
• Bachelor of Science (BS)
• Bachelor of Science in Nursing (BSN)
• Master of Agribusiness (MAB)
• Master of Agriculture (MAGR)
• Master of Architecture (MARCH)
• Master of Architecture (MARCH)
• Master of Arts (MA)
• Master of Biotechnology (MBIOT)
• Master of Business Administration (MBA)
• Master of Computer Science (MCS)
• Master of Education (MED)
• Master of Engineering (MENGR)
• Master of Engineering Technical Management (METM)
• Master of Equine Industry Management (MEIM)
• Master of Financial Management (MFM)
• Master of Fine Arts (MFA)
• Master of Geoscience (MGSC)
• Master of Health Administration (MHA)
• Master of Industrial Distribution (MID)
• Master of International Affairs (MIA)
• Master of Jurisprudence (MJUR)
• Master of Land and Property Development (MLPD)
• Master of Landscape Architecture (MLA)
• Master of Laws (LLM)
• Master of Marine Resources Management (MMRM)
• Master of Maritime Administration and Logistics (MMAL)
• Master of Natural Resources Development (MNRD)
• Master of Ocean Science and Technology (MOST)
• Master of Public Health (MPH)
• Master of Public Service and Administration (MPSA)
• Master of Real Estate (MRE)
• Master of Recreation and Resources Development (MRRD)
• Master of Science (MS)
• Master of Science in Nursing (MSN)
• Master of Science in Public Health (MSPH)
• Master of Urban Planning (MUP)
• Master of Water Management and Hydrological Science (MWM)
• Master of Wildlife Science (MWSC)
• Doctor of Dental Surgery (DDS)
• Doctor of Education (EdD)
• Doctor of Engineering (DEng)
• Doctor of Medicine (MD)
• Doctor of Pharmacy (PharmD)
• Doctor of Philosophy (PhD)
• Doctor of Public Health (DrPH)
• Doctor of Veterinary Medicine (DVM)
• Juris Doctor (JD)

The buying, selling, creating, duplicating, altering, giving or obtaining the Texas A&M diploma or other academic record is prohibited by state law. A person who violates this statute or who aids another person in violation is guilty of a misdemeanor and is subject to a fine and/or confinement if convicted.

The University has the right to rescind a previously granted degree if the University becomes aware of information indicating that the degree never should have been granted.

Requirements for a Baccalaureate Degree

To be a candidate for a degree at the end of the semester, a student must:

1. Be enrolled in or have completed all degree requirements by the 60th class day of the fall or spring semester, or the 15th class day of the second summer term either in residence or at another college or university. Proof of enrollment in any courses taken at another college or university must be provided to the Office of the Registrar, Degree Audit, by the above deadlines. A student must be enrolled in his or her degree-granting college(s) and major(s) at the beginning of the student’s last semester at Texas A&M to be a candidate for a degree from that college.

2. Complete a minimum of 120 credit hours.

3. Complete, with at least a 2.0 grade point average, all undergraduate coursework attempted at Texas A&M University.

4. Complete, with a 2.0 grade point average, all courses included in the major field of study.

5. Meet the Residence Requirement. A minimum of 36 semester hours of 300- and/or 400-level coursework must be successfully completed in residence at Texas A&M to obtain a baccalaureate degree. A minimum of 12 of these 36 semester hours must be in the major. A student participating in Texas A&M University off-campus study programs approved by the student’s college may apply upper division credits earned in the programs toward the residence requirement up to a maximum of 18 semester hours, including hours transferred from another institution as part of one of these programs. These Texas A&M University off-campus study programs may involve domestic or international institutions and may be taught by Texas A&M University faculty or faculty from other institutions. Students choosing to participate in such programs and wishing to apply credits earned from the programs toward the residence requirement must receive college approval prior to the student’s participation in the off-campus study program. Students participating in international programs must contact the Study Abroad Programs Office for details on how to obtain approval for courses taken outside the United States. Students participating in domestic off-campus programs must contact the dean’s office of their college for approval procedures.

6. Complete the University Core Curriculum. Core Curriculum courses are listed on the University Core Curriculum (p. 21) page. For additional information, please reference http://core.tamu.edu.

7. Complete the citizenship requirement, which includes at least 6 credit hours in government/political science and at least 6 credit hours in American history. American National Government (POLS 206) and State and Local Government (POLS 207) fulfill the government/political science requirement.
   a. Both the government/political science and American history requirements may be met, in whole or in part, by equivalent coursework satisfactorily completed at another accredited college or university.
   b. State law permits the substitution of 3 hours of history and 3 hours of government/political science for a student in the program of an approved senior ROTC unit. With the approval of the dean of the appropriate college, students successfully completing the required 12 hours of upper-level ROTC courses will be deemed to have completed the equivalent of POLS 206 or POLS 207 plus HIST 105 or HIST 106 (or another appropriate course) for a total of 6 hours.
   c. Students pursuing teacher certification are not allowed to substitute ROTC credits for this requirement.

8. Complete the Foreign Language requirement. A minimum of one year of foreign language is required for all baccalaureate degree programs at Texas A&M. For many programs, this degree requirement can be satisfied by the satisfactory completion of two units of the same foreign language at the high school level or one year of the same language at the college level.
   a. International students whose native language is not English are exempted from satisfying the university foreign language requirement. These students may not register for the beginning and intermediate level courses in their native language (course numbers 101, 102, 201, and 202) which are used to fulfill the foreign language requirement.
b. Many Bachelor of Arts degrees require at least 6 additional semester credit hours of foreign language at the 200-level. Students should consult with an academic advisor about specific language requirements for their degree program.

c. Students who wish to demonstrate foreign language proficiency without taking acceptable high school or college courses may do so through the existing credit by examination process. In cases where students wish to demonstrate proficiency in a language not taught at Texas A&M, the following procedures shall apply. The student shall request an examination from the Head of the Department of Hispanic Studies or the Head of the Department of International Studies. This department will coordinate the administration of special examinations to demonstrate foreign language proficiency. This will include finding an appropriate examination to test the student’s proficiency, informing the student how to arrange to take the examination and certifying the results to the student’s advisor. All arrangements shall be made and fees paid by the student.

d. American Sign Language (ASL) may be used to fulfill the foreign language degree requirement unless otherwise specified by the student’s college or department. Students may either transfer ASL credits or arrange to be tested at another institution. (Texas A&M does not offer courses in ASL.)

9. Complete the Writing requirement. The requirement may be met by passing two writing (W) courses or one writing (W) course and one oral communication (C) course in the student’s major. The requirement may not be met by any course listed as a University Core Curriculum communication requirement, nor may it be met through credit by examination. It may be met by a course transferred from another institution of higher learning, with the approval of the dean of the student’s college and the Associate Provost for Undergraduate Studies. Upon request, students will provide their dean with a course description, syllabus or writing sample from the course being transferred.

10. Complete the International and Cultural Diversity requirement (6 credit hours). As individual and national destinies become progressively more interconnected, the ability to survive and succeed is increasingly linked to the development of a more pluralistic, diverse and globally-aware populace. Two courses from the list available on the International and Cultural Diversity Requirements (p. 40) page are to be taken by the student. For additional information, please reference http://icd.tamu.edu. If a course listed also satisfies a Core Curriculum requirement, it can be used to satisfy both requirements if the student wishes to do so.

11. Be formally recommended for graduation by the Faculty Senate after consideration of his or her complete record.


Undergraduate Minor Programs
A minor is a selection of courses that focus on a single area or an interdisciplinary perspective as developed by the department or program that offers the minor. The department or program offering the minor is responsible for setting enrollment limits and deciding which courses are used to meet the minor. Coursework consists of 15-18 hours with a minimum of 6 in residence at the 300-400 level.

If a minor is offered by a department or academic unit, then the minor is considered to be available to all students as resources permit. Students must declare a minor no later than the date on which they apply for graduation. A maximum of two minors per degree can be completed by students. A minor is displayed on the transcript after graduation but not displayed on the diploma.

Two Degrees
A student pursuing a second baccalaureate degree must complete all university, college, and department/curricular requirements for the second degree not covered in the first. All essential work required for a second degree must be defined in advance in writing by the Dean or designee of the college granting the second degree. In all such cases, the total semester hours required must be at least 30 hours additional to the greater number required for either degree. At least 12 hours of 300- and 400-level course work must be completed in each field of study.

A student who has previously not been enrolled at Texas A&M University and who is seeking a second degree must have a minimum of 36 hours of 300- and 400-level courses, 12 hours of which must be in the major field of study, in residence at Texas A&M. The student must also meet the citizenship requirements for American history and government/political science.

Baccalaureate Degree Option for Students Granted Early Admission to Professional Programs
A minimum of 120 hours is required for a Texas A&M University undergraduate degree. Some degree programs require additional hours (see specific degree requirements for each major in this catalog). Students from undergraduate programs who are selected early into participating programs in medicine, dentistry, optometry, pharmacy, or veterinary medicine must have satisfied all University Core Curriculum requirements as specified in this catalog. A student intending to use this baccalaureate degree option must coordinate early in his or her program with the appropriate undergraduate advisor in order to ensure that degree requirements are met. The degree candidate must complete at least half of the total hours required for the baccalaureate degree while in residence at Texas A&M University. This requirement includes a minimum of 24 hours of upper division courses in residence, of which a minimum of 12 must be in the major. A student will become eligible for the Texas A&M degree upon completion of the total credit hours required by his or her undergraduate degree plan. Each undergraduate major specifies those professional courses that may be used to satisfy its degree plan.

A student then selected into an approved professional program will be required to successfully complete a minimum of one full year of acceptable work at an accredited school of medicine, dentistry, optometry, pharmacy, or veterinary medicine in the United States. The student will be responsible for submitting official transcripts to the Office of Admissions to verify completion of agreement requirements. The participating undergraduate department or program will complete the required degree audit, approve the necessary substitutions and clear the student to graduate.

Baccalaureate degrees will be awarded in May, August, and December after the completion of the first year of the approved professional program or the necessary hours for the desired baccalaureate degree. Students must apply for graduation at Howdy. Check the academic calendar for deadlines and for commencement dates. Questions may be emailed to degree-audit@tamu.edu or call (979) 845-1089. For additional information about graduation, visit the graduation (http://graduation.tamu.edu) website.
Students who have received a baccalaureate degree are not eligible to participate in commencement. Individuals who would have been eligible to participate in this program had it been in effect when they were students at Texas A&M University may request the conferral of a baccalaureate degree. Although this is a University-wide policy, not all colleges choose to participate. The use of this baccalaureate option will remain a college initiative in that each individual college and/or program must clear each candidate for graduation.

Graduation with Honors

Undergraduate Students

To be eligible for graduation with Latin honors, a student seeking a baccalaureate degree must enroll in and complete a minimum of 60 semester hours at Texas A&M University, Texas A&M University Galveston campus, or Texas A&M University Qatar campus preceding graduation and have an institutional grade point average equal to or greater than that required for the appropriate category of honors. Course credit received by examination, and courses reserved for graduate credit only, are excluded from the calculation of the number of hours and the grade point average for graduation with Latin honors.

Categories for Latin honors shall be designated as follows:

- **Summa Cum Laude**: A student may be graduated Summa Cum Laude with a grade point average of 3.90 or above.
- **Magna Cum Laude**: A student may be graduated Magna Cum Laude with a grade point average range of 3.70 through 3.899.
- **Cum Laude**: A student may be graduated Cum Laude with a grade point average range of 3.50 through 3.699.

Grade point averages used to determine Latin honors designations are calculated during the final degree audit the day before the ceremonies and include hours and final grades in courses taken during the graduation semester. Latin honors designations will not be changed after the final graduation clearance deadline.

Information regarding other honors designations may be found on the Honors and Undergraduate Research (p. 103) page.

Please note:

- Students are not required to enroll in honors courses to graduate with Latin honors.
- Taking designated honors courses does not mean students will graduate with Latin honors.

No Upper Division student found guilty of academic misconduct may receive Cum Laude, Magna Cum Laude, or Summa Cum Laude honors at graduation. Upper Division status is defined as having earned 60 or more credit hours, including transfer hours, prior to the date of the violation. This sanction is automatic upon a finding of academic misconduct, and is imposed without regard to the severity of other sanctions imposed by the instructor or Honor Council.

For more information, please see the Aggie Honor System Office (p. 79) section in the catalog.

First-Professional Students

- Students who complete their entire course of study at Texas A&M University in the College of Medicine are eligible for academic honors. In the College of Medicine, students must obtain a grade point average of 3.50 or greater to graduate with honors.

- In the Irma Lerma Rangel College of Pharmacy, students are eligible for Latin Honors as follows: Summa Cum Laude (4.0-3.90), Magna Cum Laude (3.89-3.75), and Cum Laude (3.74-3.50).
- A student who graduates in the top 2% of the graduating class of the School of Law is designated as graduating Summa Cum Laude; a student who is not in the top 2% but graduates in the top 5% of the graduating class of the School of Law is designated as graduating Magna Cum Laude, and a student who is not in the top 5% but graduates in the top 10% of the graduating class of the School of Law is designated as graduating Cum Laude.
- A first-professional student in the College of Veterinary Medicine may qualify to graduate Summa Cum Laude by holding a final grade point average of 3.90 or above, Magna Cum Laude with a grade point average of 3.70 through 3.899 and Cum Laude with a grade point average of 3.50 through 3.699.

Graduation Application, Diploma and Commencement

Formal application for degrees must be submitted online in Howdy by the deadline stated in the academic calendar.

The diploma of the University, with the appropriate degree, will be granted to the student who has made formal application for the degree by the published official deadline, has all grades on record in the Office of the Registrar, including grades pertaining to graduation with honors, and has satisfied all degree requirements by no later than 5 p.m., Friday, the first week of classes of the succeeding semester or summer term following commencement.

Students must have settled all financial obligations to the university prior to receiving a diploma.

Graduate and undergraduate students who plan to attend a commencement ceremony must do so the semester they apply for graduation and complete their degree requirements.

Tuition Charged for Excess Credit Hours

The State of Texas will not provide funds to state institutions of higher education for excess semester credit hours earned by a resident student. Because funding will not be provided by the State, and as permitted by State law, Texas A&M University will charge tuition at the non-resident rate to all students who exceed the semester credit hour limit for their program. Excess semester credit hours are those which accrue after the student attempts more than 30 hours beyond the number of semester credit hours required for the completion of the degree program in which the student is enrolled. Thus, the student may accumulate up to 30 hours beyond those required for the chosen degree program and not exceed the limitation. The limitation on excess credit hours applies only to those undergraduate students who first enter higher education in the fall 1999 and thereafter. The semester credit hours counted toward the limitation include all hours attempted by the student except:

- Semester credit hours earned by the student before receiving a baccalaureate degree that has been previously awarded.
- Semester credit hours earned by the student by examination or other procedure by which credit is earned without registering for a course for which tuition is charged.
- Credit for remedial education courses, technical courses, workforce education courses funded according to contact hours, or other
courses that would not generate academic credit that could be
applied toward a degree program at Texas A&M University.
• Semester credit hours earned by the student at a private or an out-of-
  state institution.
• Semester credit hours earned by the student before graduating from
  high school and used to satisfy high school graduation requirements
  (Effective June 2009).
• Hours not eligible for formula funding.
• Semester credit hours earned 10 or more years before the student
  began his or her degree program that have been excluded from the
  student record due to an election of admission under the Academic
  Fresh Start program.

Supplementary Fee for Courses Attempted More than Twice

Certain courses that are attempted by a student more than twice at
a public institution of higher education in Texas may not be reported
for state funding. As a result, the institution must either pass the non-
funded portion to all students, or charge a supplementary fee to the
student who is repeating the course. Texas A&M has chosen to assess
a supplementary fee to those students attempting a course more than
twice.

A student attempting certain courses more than twice at Texas A&M
University will be subject to a supplementary fee of $125 per semester
credit hour ($375 for a 3 hour course) for the repeated course, in addition
to tuition and required fees associated with the course.

Students will be notified at the time they register for a course that it
has been taken twice at Texas A&M University and is subject to the
supplementary fee.

Degree Programs Tables

Undergraduate, Graduate and Professional Degree Programs

Approved by the Texas Higher Education Coordinating Board

<table>
<thead>
<tr>
<th>Interdisciplinary Degree Programs</th>
<th>Baccalaureate</th>
<th>Masters</th>
<th>Doctorate</th>
<th>Professional</th>
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<td>Agribusiness and Managerial</td>
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<td>Economics</td>
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<td>Biotechnology</td>
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<td>Ecology and Evolutionary Biology</td>
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<td>Energy</td>
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<td>Equine Industry Management</td>
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<td>Physiology of Reproduction</td>
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<td>Department of Ecosystem Science and Management</td>
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<tr>
<td>Biological and Agricultural Engineering BS</td>
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<td>Forestry BS</td>
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<td>Natural Resources Development MS, MAgr PhD</td>
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<td>Rangeland Ecology and Management BS</td>
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<td>Spatial Sciences BS</td>
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<th>Department of Recreation, Park and Tourism Sciences</th>
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<td>Natural Resources Development BS</td>
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<td>Recreation, Park and Tourism Sciences BS</td>
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<th>Department of Soil and Crop Sciences</th>
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<td>Soil Science MS</td>
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<td>Turfgrass Science BS</td>
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1 Also offered as joint program with Texas Tech University when offered by Distance Education.
2 Joint Program with College of Education and Human Development. Degrees conferred in College of Agriculture and Life Sciences.
3 Also offered as cooperative program with Texas A&M University–Kingsville.

### College of Architecture

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<th>Degree Program</th>
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<th>Masters</th>
<th>Doctorate</th>
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## College of Geosciences

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## The Bush School of Government and Public Service

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### College of Medicine

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1. Step 1 Doctoral Program with Texas A&M International University, Texas A&M University – Corpus Christi and Texas A&M University – Kingsville.
## Degree Information

### Department of Surgery

#### College of Nursing

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#### Irma Lerma Rangel College of Pharmacy

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#### Department of Pharmaceutical Sciences

#### Department of Pharmacy Practice

### School of Public Health

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#### Department of Epidemiology and Biostatistics

| Biostatistics | MPH |
| Biostatistics | MPH |
| Epidemiology  | MPH |

#### Department of Environmental and Occupational Health

| Environmental Health | MPH |

#### Department of Health Policy and Management

| Health Policy and Management | MPH |

#### Department of Health Promotion and Community Health Sciences

| Health Promotion and Community Health Sciences | MPH | DrPH |

### College of Science

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#### Department of Chemistry

| Chemistry | BA, BS | MS | PhD |

#### Department of Mathematics

| Applied BS |          |
| Mathematical Sciences |
| Mathematics | BS, MS | PhD |

#### Department of Physics and Astronomy

| Astronomy | MS | PhD |
| Physics | BA, BS | MS | PhD |
| Applied Physics |              |

#### Department of Statistics

| Analytics | MS |
| Statistics | BS, MS | PhD |

#### College of Veterinary Medicine and Biomedical Sciences

#### Department of Biomedical Sciences

| Biomedical Sciences | BS | MS | PhD |
| Science and Technology |          |
| Journalistim | DVM |

#### Department of Veterinary Integrative Biosciences

| Veterinary Medicine |          |

#### Department of Veterinary Large Animal Clinical Sciences

#### Department of Veterinary Pathobiology

#### Department of Veterinary Physiology and Pharmacology

#### Department of Veterinary Small Animal Clinical Sciences

#### Texas A&M University Galveston Campus

#### Department of University Studies

| University Studies | BA, BS |

#### Department of Liberal Studies

| BA, BS |          |
Graduate Degree Programs

- Doctor of Education (EdD) in Agricultural Education
- Doctor of Education (EdD) in Curriculum and Instruction
- Doctor of Philosophy (PhD) in Plant Breeding
- Master of Agriculture (M Agr) in Agricultural Development
- Master of Agriculture (M Agr) in Poultry Science
- Master of Education (M Ed) in Bilingual Education
- Master of Education (M Ed) in Curriculum and Instruction
- Master of Education (M Ed) in Educational Administration
- Master of Education (M Ed) in Educational Psychology
- Master of Education (M Ed) in Educational Technology
- Master of Education (M Ed) in Special Education
- Master of Engineering (M Engr) in Aerospace
- Master of Engineering (M Engr) in Biological and Agricultural Engineering
- Master of Engineering (M Engr) in Computer Engineering
- Master of Engineering (M Engr) in Electrical Engineering
- Master of Engineering (M Engr) in Engineering
- Master of Engineering (M Engr) in Industrial Engineering
- Master of Engineering (M Engr) in Mechanical Engineering
- Master of Engineering (M Engr) in Petroleum Engineering
- Master of Engineering Technical Management (METM) in Technical Management
- Master of Geoscience (MGSC) in Geoscience
- Master of Industrial Distribution (MID) in Industrial Distribution
- Master of Jurisprudence (MJur) in Jurisprudence
- Master of Laws (LLM) in Laws
- Master of Maritime Administration and Logistics (MMAL) in Maritime Administration and Logistics
- Master of Natural Resource Development (MNRD) in Natural Resource Development
- Master of Public Health (MPH) in Epidemiology
- Master of Public Service and Administration (MPSA) in Public Service and Administration
- Master of Recreation and Resources Development (MRRD) in Recreation and Resources Development
- Master of Science (MS) in Agricultural Systems Management
- Master of Science (MS) in Analytics
- Master of Science (MS) in Bilingual Education
- Master of Science (MS) in Education for Health Care Professionals
- Master of Science (MS) in Educational Human Resource Development
- Master of Science (MS) in Educational Psychology
- Master of Science (MS) in Energy
- Master of Science (MS) in Engineering Systems Management
- Master of Science (MS) in Health Education
- Master of Science (MS) in Mathematics
- Master of Science (MS) in Plant Breeding
- Master of Science (MS) in Safety Engineering
- Master of Science (MS) in Special Education
- Master of Science (MS) in Sport Management
- Master of Science (MS) in Statistics
- Master of Science in Nursing (MSN) in Family Nurse Practitioner

Texas A&M University Qatar Campus

Degree Programs Via Distance Education

Texas A&M University currently offers the following programs by distance education:

Undergraduate Degree Program

- Bachelor of Science in Nursing (BSN) in Nursing
A limited number of graduate certificate programs are available by distance education. Please review Transcribed Graduate Certificate Programs.

The delivery platform differs among these programs. Most are available 100% online, some are web-supported with interactive video and others require periodic campus visits. The delivery platform in most programs changes depending on the course/program content, needs of the students and their geographic locations. Students should carefully consider distance education and address any specific questions to the department offering the program of interest.

Only a student who is admitted to Texas A&M University may enroll in these distance education programs and the associated courses. A student wishing to enroll in any of the distance education programs must be admitted as a degree-seeking graduate student or as a post-baccalaureate non-degree seeking student. Please see http://admissions.tamu.edu for graduate admissions information.

A student may take up to 12 hours in non-degree-seeking post-baccalaureate status and apply these hours to a master's program. Post-baccalaureate non-degree status does not establish eligibility for admission to degree-seeking status.

Texas A&M University provides students pursuing a graduate degree by distance a wide variety of student support services, including access to library resources, advising, technology support and course materials acquisition through the online bookstore. A complete listing of services, degree program descriptions, appropriate points of contact within each program, and costs are available through the distance education website at http://distance.tamu.edu. Additional distance education programs are in development. Interested students should check the website periodically for updates. Students should contact the department offering the program for any questions.

Minors

Minors

College of Agriculture and Life Sciences

- Master of Science in Nursing (MSN) in Forensic Nursing
- Master of Science in Nursing (MSN) in Nursing Education
- Master of Wildlife Science (MWSC) in Wildlife Science

A limited number of graduate certificate programs are available by distance education. Please review Transcribed Graduate Certificate Programs.

The delivery platform differs among these programs. Most are available 100% online, some are web-supported with interactive video and others require periodic campus visits. The delivery platform in most programs changes depending on the course/program content, needs of the students and their geographic locations. Students should carefully consider distance education and address any specific questions to the department offering the program of interest.

Only a student who is admitted to Texas A&M University may enroll in these distance education programs and the associated courses. A student wishing to enroll in any of the distance education programs must be admitted as a degree-seeking graduate student or as a post-baccalaureate non-degree seeking student. Please see http://admissions.tamu.edu for graduate admissions information.

A student may take up to 12 hours in non-degree-seeking post-baccalaureate status and apply these hours to a master’s program with the approval of the student’s advisory committee, the head of the department (or Chair of the Intercollegiate Faculty, if appropriate), and the Office of Graduate and Professional Studies if all admission requirements to the selected master’s program are fulfilled. Courses offered for extension credit may not be used on the student’s degree plan. Post-baccalaureate non-degree status does not establish eligibility for admission to degree-seeking status.

Texas A&M University provides students pursuing a graduate degree by distance a wide variety of student support services, including access to library resources, advising, technology support and course materials acquisition through the online bookstore. A complete listing of services, degree program descriptions, appropriate points of contact within each program, and costs are available through the distance education website at http://distance.tamu.edu. Additional distance education programs are in development. Interested students should check the website periodically for updates. Students should contact the department offering the program for any questions.
Earth Sciences (p. 432)
Environmental Geosciences (p. 433)
Geographic Information Science and Technology (GIST) (p. 451)
Geography (p. 450)
Geology (p. 458)
Geophysics (p. 458)
Meteorology (p. 438)
Oceanography (p. 461)

College of Liberal Arts
Africana Studies (p. 477)
Anthropology (p. 487)
Arabic Studies (p. 535)
Asian Studies (p. 535)
Chinese (p. 536)
Classical Studies (p. 536)
Communication (p. 493)
Comparative Cultural Studies - International (p. 478)
Comparative Cultural Studies - United States (p. 479)
Economics (p. 503)
English (p. 510)
Film Studies (p. 480)
French (p. 537)
German (p. 537)
Global Culture and Society (p. 480)
Hispanic Studies for Community Engagement (p. 513)
History (p. 517)
Italian (p. 537)
Japanese (p. 538)
Journalism (p. 480)
Latina/o and Mexican-American Studies (p. 559)
Leadership (p. 481)
Liberal Arts Honors (p. 481)
Museum Studies (p. 487)
Performance Studies (p. 540)
Performance Technology (p. 540)
Philosophy (p. 542)
Psychology (p. 552)
Religious Studies (p. 482)
Russian (p. 538)
Sociology (p. 559)
Spanish (p. 514)
Women's and Gender Studies (p. 483)

School of Military Science
Military Studies (p. 660)

School of Public Health
Occupational Health and Safety (p. 580)
Public Health Studies (p. 580)

College of Science
Astrophysics (p. 639)
Bioinformatics (p. 596)
Biology (p. 597)
Chemistry (p. 612)
Mathematics (p. 634)
Physics (p. 639)
Statistics (p. 642)

College of Veterinary Medicine and Biomedical Sciences
Biomedical Sciences (p. 650)

Texas A&M University Galveston Campus
Diving Technology and Methods (p. 669)
Marine Biology (p. 675)
Maritime Administration (p. 691)
Maritime Studies (p. 670)
Ocean and Coastal Resources (p. 688)

Certificates

Interdisciplinary
Neuroscience (p. 111)

College of Agriculture and Life Sciences
Community Recreation and Park Administration (p. 194)
Enology (p. 170)
Equine Science (p. 141)
Hospitality Management (p. 194)
International Trade and Agriculture (p. 130)
Meat Science (p. 141)
Parks and Conservation (p. 194)
Professional Event Manager (p. 195)
Public Health Entomology (p. 167)
Tourism Management (p. 195)
Watershed (p. 159)
Youth Development (p. 195)

College of Architecture
Diversity (p. 212)

Mays Business School
Advertising Strategy (p. 281)
Analytics and Consulting (p. 281)
Commercial Banking (p. 253)
Energy Accounting (p. 249)
Entrepreneurial Leadership (p. 271)
European Union Business (p. 241)
Internal Audit (p. 250)
International Business Studies (p. 241)
Investment Banking (p. 253)
Latin American Business (p. 243)
Nonprofit and Social Innovation Certificate (p. 244)
Professional Selling and Sales Management (p. 282)
Retail Buying and Management (p. 282)
Trading, Risk and Investments (p. 254)

College of Education and Human Development
Creative Studies (p. 302)

College of Engineering
Data Center Operations Engineering (p. 403)
Energy Engineering (p. 421)
Engineering Honors (p. 349)
Engineering Leadership (p. 349)
Engineering Systems Management (p. 403)
Engineering Therapeutics Manufacturing (p. 359)
International Engineering (p. 349)
Polymer Specialty (p. 349)
Quality Engineering for Regulated Medical Technologies (p. 359)
Safety Engineering (p. 350)

**College of Geosciences**
Diversity (p. 484)

**College of Liberal Arts**
Applied Behavioral Health (p. 552)
Business Economics (p. 504)
Communication and Global Media (p. 494)
Communication Leadership and Conflict Management (p. 494)
Diversity (p. 484)
Health Communication (p. 494)
Healthy Development (p. 553)
Philosophy Pre-Law (p. 542)
Psychology of Diversity (p. 553)
Quantitative Economic Methods (p. 504)
Strategic Communication (p. 495)
Work and Organizations (p. 553)

**College of Veterinary Medicine and Biomedical Sciences**
Biomedical Research and Development (p. 654)
Cultural Competency and Communications in Spanish (p. 651)

**School of Military Science**
Leadership Study and Development (p. 661)

For more information on undergraduate certificate programs, please visit the Office of the Registrar (http://registrar.tamu.edu/Our-Services/Curricular-Services/Curricular-Approvals/Program-Approvals/Approved-Certificate-Programs) website.

### International and Cultural Diversity Requirements

Students are required to complete six (6) semester credit hours from the courses listed.

<table>
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<td>Architecture, Heritage and Culture</td>
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<td>Economic Development</td>
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NURS 466  Community Health for the RN  5
NUTR 300/  Religious and Ethnic Foods  3
FSTC 300
PERF 301  Performance in World Cultures  3
PERF 325/ MUSC 325  Dance and World Cultures  3
PERF 326  Dance and Identity in the United States  3
PERF 327  Popular Musics in the African Diaspora  3
PHIL 283  Latin American Philosophy  3
PHIL 416  Recent British and American Philosophy  3
PHIL 419  Current Continental Philosophy  3
PHLT 307  Public Health in the Global Context  3
POLS 229  Introduction to Comparative Politics  3
POLS 231  Introduction to World Politics  3
POLS 317/ WGST 317  Women in Politics  3
POLS 322  Western European Government and Politics  3
POLS 323  Political Systems of Latin America  3
POLS 324  Politics of Global Inequality  3
POLS 326  Government and Politics of Eastern Europe  3
POLS 328  Globalization and Democracy  3
POLS 338  Government and Politics of the Former Soviet Union  3
POLS 365/ ASIA 365  Asian Governments and Politics  3
POLS 366  Political Conflicts of the Middle East  3
POLS 367/ WGST 367  Women in Government in Comparative Perspective  3
POLS 424  Comparative Governmental Institutions  3
POLS 432  The Politics of European Union  3
POLS 462/ WGST 462  Women and the Law  3
PSYC 206/ AFST 206  Black Psychology  3
PSYC 208/ AFST 208  Stereotypes, Prejudice, and Minority Experience  3
PSYC 209/ AFST 209  Psychology of Culture and Diversity  3
PSYC 300/ WGST 300  Psychology of Women  3
PSYC 303  Psychology of Women of Color  3
RELS 303/ HUMA 303  Near Eastern Religions  3
RELS 304/ HUMA 304  Indian and Oriental Religions  3
RELS 312  Contemplation in the Modern World  3
RELS 321  Political Islam and Jihad  3
RELS 403/ ANTH 403  Anthropology of Religion  3
RPTS 340  Recreation, Parks, Tourism and Diverse Populations  3
RUSS 201  Intermediate Russian I  3
RUSS 202  Intermediate Russian II  3
RUSS 443/ EURO 443  Contemporary Russian Prose  3
RUSS 444/ EURO 444  Russian Drama  3
RUSS 447/ EURO 447  Russian Artistic Culture II: 1890 to Present  3
SCSC 420  Brazilian Agriculture and Food Production Systems  3
SOCI 205  Introduction to Sociology  3
SOCI 206  Global Social Trends  3
SOCI 207/ WGST 207  Introduction to Gender and Society  3
SOCI 212  Sociology of Popular Culture  3
SOCI 217  Introduction to Race and Ethnicity  3
SOCI 310/ WGST 310  Motherhood in Society  3
SOCI 312  Population and Society  3
SOCI 313  Military, War and Society  3
SOCI 314  Social Problems  3
SOCI 315/ WGST 315  The Marriage Institution  3
SOCI 316/ WGST 316  Sociology of Gender  3
SOCI 317/ AFST 317  Racial and Ethnic Relations  3
SOCI 323/ AFST 323  Sociology of African Americans  3
SOCI 325/ ASIA 325  International Business Behavior  3
SOCI 327  Morality and Society  3
SOCI 329/ ASIA 329  Pacific Rim Business Behavior  3
SOCI 330  Sociology of Nutrition  3
SOCI 403  Sociology of Latinos  3
SOCI 419  Social Class in Contemporary Society  3
SOCI 423  Globalization and Social Change  3
SOCI 424/ WGST 424  Women and Work in Society  3
SPAN 201  Intermediate Spanish I  3
SPAN 202  Intermediate Spanish II  3
SPAN 312  Hispanic Culture and Civilization: 18th Century to Present  3
SPAN 320  Introduction to Hispanic Literature  3
SPAN 410  Hispanic Film  3
SPAN 411  Contemporary Hispanic Society and Culture  3
SPAN 412  U.S. Hispanic Writers  3
SPAN 421  Spanish Language Poetry  3
SPAN 450  Contemporary Spanish and Spanish-American Literature  3
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<td>Japanese Traditional Performing Arts</td>
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<td>Urban Issues</td>
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<tr>
<td>HIST 477</td>
<td>European History</td>
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**Admission**

**General Application Information**

**Application Information**

Both Texas resident and non-resident students can apply for undergraduate admission to any Texas Public University for freshman, transfer and international admission by using the ApplyTexas Application or Coalition Application.

You may access the appropriate application from the ApplyTexas Application website (www.applytexas.org), the Coalition Application website (http://www.coalitionforcollegeaccess.org/) or the Texas A&M University website (http://admissions.tamu.edu).

Texas A&M University has several conveniently located Prospective Student Centers throughout the state, staffed with regional advisors ready to serve you. Please contact the center nearest you to learn more about admissions, financial aid, academic programs and student services. Visit the website admissions.tamu.edu/psc for more details.

**Aggieland Prospective Student Center**

Texas A&M University  
109 John J. Koldus Building  
1265 TAMU  
College Station, TX 77843-1265  
(979) 458-0950

**Corpus Christi Regional Prospective Student Center**

5350 South Staples, Suite 405  
Corpus Christi, TX 78411  
(361) 289-7905

**Dallas/Fort Worth Regional Prospective Student Center**

3900 Arlington Highlands Blvd., Suite 273  
Arlington, TX 76018  
(817) 375-0960

**Houston Regional Prospective Student Center**

1225 North Loop West, Suite 200  
Houston, TX 77008  
(713) 454-1990

**Laredo Regional Prospective Student Center**

6401 Arena Road, Suite 5A  
Laredo, TX 78041  
(956) 795-0412
The admission guidelines presented here are for admission to the Spring, Summer or Fall 2018 semester. While they are the best guide available, admission criteria are subject to change. The Office of Admissions website (http://admissions.tamu.edu) contains the admission policies and procedures in effect for 2018 admission.

### Types of Admission and Application Calendars

<table>
<thead>
<tr>
<th>At the Time of Application</th>
<th>Term</th>
<th>Opening Date</th>
<th>Closing Date</th>
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<tbody>
<tr>
<td>Freshman</td>
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<tr>
<td>• is a citizen or permanent resident of the United States or qualifies for Texas residency based on Senate Bill 1528</td>
<td>Fall 2018</td>
<td>Jul. 1, 2017</td>
<td>Dec. 1, 2017</td>
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<tr>
<td>• is a degree-seeking applicant and is without college credit or • is still in high school, with or without college credit</td>
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<tr>
<td>Transfer</td>
<td>Spring 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An applicant who:</td>
<td>Summer/Fall</td>
<td>Jan. 1, 2018</td>
<td>Mar. 1, 2018</td>
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<tr>
<td>• is a citizen or permanent resident of the United States or qualifies for Texas residency based on Senate Bill 1528</td>
<td>Fall 2018</td>
<td>Oct. 15, 2017</td>
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</tr>
<tr>
<td>• is a degree-seeking applicant and has graduated from high school or equivalent</td>
<td>Spring 2019</td>
<td>Apr. 1, 2018</td>
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<tr>
<td>• has enrolled in a post-secondary institution after graduation from high school</td>
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<td>Aug. 1, 2018</td>
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<tr>
<td>• does not have a bachelor’s degree</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• does not qualify for readmission</td>
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### International Freshman

<table>
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<tr>
<th>Term</th>
<th>Opening Date</th>
<th>Closing Date</th>
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<tbody>
<tr>
<td>Spring 2018</td>
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<td>Aug. 1, 2017</td>
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<tr>
<td>Spring 2019</td>
<td>Apr. 1, 2018</td>
<td>Aug. 1, 2018</td>
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### International Transfer

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<td>Spring 2018</td>
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<td>Aug. 1, 2017</td>
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<tr>
<td>Fall 2018</td>
<td>Oct. 15, 2017</td>
<td>Mar. 1, 2018</td>
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</tbody>
</table>

Se habla español.
An applicant who:
• is not a citizen or permanent resident of the United States (or applicant for permanent residency) and does not qualify for Texas residency based on Senate Bill 1528
• is an applicant seeking a bachelor’s degree
• has graduated from high-school or equivalent
• has enrolled in a post-secondary institution, and
• is not eligible for readmission (has never enrolled at Texas A&M University as an undergraduate degree-seeking student).

Readmission

<table>
<thead>
<tr>
<th>Course</th>
<th>Spring 2018</th>
<th>Summer 2018</th>
<th>Fall 2018</th>
<th>Spring 2019</th>
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<tbody>
<tr>
<td></td>
<td>Spring 2018</td>
<td>Summer 2018</td>
<td>Fall 2018</td>
<td>Spring 2019</td>
</tr>
</tbody>
</table>

Postbaccalaureate

Undergraduate

An applicant who:
• has a bachelor’s 2018 degree
• wishes to pursue a second undergraduate degree

<table>
<thead>
<tr>
<th>Course</th>
<th>Spring 2018</th>
<th>Summer/Fall 2018</th>
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</thead>
</table>

Non-degree

Undergraduate

An applicant who:
• does not wish to pursue a degree at Texas A&M
• wishes to take specific undergraduate coursework

<table>
<thead>
<tr>
<th>Course</th>
<th>Spring 2018</th>
<th>Summer/Fall 2018</th>
</tr>
</thead>
</table>

High School Enrichment Program

An applicant who:
• is a former degree-seeking Texas A&M undergraduate student (including an international student)
• does not have a bachelor’s degree
• did not officially register for the previous semester (excluding summer sessions) at Texas A&M

Readmission does not include applicants whose only previous enrollment at Texas A&M has been as a non-degree student.
An applicant who:
- is a high school junior or senior in the Bryan/College Station area
- has a new SAT score of 1270, or an ACT score of 27
- has completed all levels of related coursework offered at their high school

Each student is eligible to take 1 (one) course per fall or spring semester, and course registration will be completed by the TAMU advisor. No summer classes are offered at this time. Classes will be held on the Texas A&M University campus. Students and their parents/guardians will be responsible for any lodging or transportation considerations. Admission for this program is on a space-available basis. The applicant pool is competitive, and admission into this program is not guaranteed.

1 An applicant who has enrolled in a post-secondary institution since high school graduation, with or without credit earned, must apply as a transfer applicant.

Items Necessary to Complete an Application File

Please see the Readmission, Post-baccalaureate or Non-degree sections for other items required to complete the transfer application for those types of admission. U.S. citizens completing a non-U.S. high school program should refer to International Admissions for questions concerning transcripts, examination results and foreign credentials.

An application is reviewed to make a decision about admission after all items listed below have been received. The items must be received by the appropriate closing date to qualify for consideration for admission.

In addition, freshman applicants must show proof of meeting the State of Texas Uniform Admission Policy to qualify for review.

Application submitted electronically via ApplyTexas

Application Fee (check, money order, Visa, MasterCard, Discover or American Express)—All fees are nonrefundable
- Domestic Undergraduate - $75
- Domestic Graduate - $65
- International - $90
- Checks and money orders should be made payable to Texas A&M University. International checks must be backed by a U.S. bank and be issued in U.S. dollars. The applicant's name and date of birth should be written on the face of checks and money orders.

Guidelines for requesting application fee waivers:
- Fee waivers are not available for international students.

Freshman Waivers

Applicants who qualify for federally funded free/reduced lunch programs may qualify for a fee waiver. Please see our admissions website, http://admissions.tamu.edu/freshman/apply, for instructions for requesting a waiver.

Transfer or Readmit Waivers

To request a fee waiver, please provide your Student Aid Report (SAR), which you will find within your current FAFSA or a copy of an award letter from your current institution. Checking the fee waiver box on the application will not satisfy the fee waiver requirement.

The documents can be uploaded through the Applicant Information System (AIS) page. Documents will also be accepted by fax at (979) 458-4302 or email at d-nichols@tamu.edu, as well as U.S. mail.

Essays
- Freshman applicants are required to complete Essay Topics A and B. Essay Topic C is strongly recommended for applicants to be considered in the holistic review process.
- Transfer applicants are required to complete Essay Topic A.

SAT or ACT Scores
- Required of all freshman applicants, including all international freshman applicants.
- Scores should be sent directly from the testing agency and must be received by the posted deadline to be considered
- The SAT code is 6003; the ACT code is 4198.
- Test scores must be from a test date within five years of the date of planned enrollment.
- The highest test score from one test date will be used. Texas A&M does not allow combined test scores from different test dates.
Official High School Transcripts

- Freshman applicants who have not graduated from high school at the time of application must submit an official transcript indicating coursework, credits earned, grades, graduation plan/ diploma type and a numerical class rank at least through their junior year. If admitted, the applicant will be required to submit a final transcript with graduation data.
- If the applicant’s high school does not rank its students, a school profile from the high school must be provided as part of the application file.
- Freshman and transfer applicants who have graduated from high school at the time of application should submit an official high school transcript that includes grades and credits for all completed coursework, a numerical class rank, date of graduation and graduation plan completed, or a certificate verifying completion of a GED program.
- Readmit and post-baccalaureate applicants are not required to submit a high school transcript as part of the application file.
- To be considered official, a transcript must bear an original signature of a school official or an original school seal.
- Official paper transcripts are to be sent by the sending institution in a sealed envelope. The transcript will not be considered official if the student has had access to the actual transcript.
- Transcripts in a language other than English must be accompanied by an official English translation. Applicants who have attended high school both in the U.S. and out of the U.S. should submit official transcripts from each school attended.
- For students enrolled in the U.S., copies of official transcripts from other countries will be accepted provided the copies are on file and verified by the U.S. institution.
- Faxed copies are not official and will not be accepted.

Official College Transcripts

- An official transcript is required from every post-secondary institution attended even if the applicant did not earn credit, receive a course grade or the course is not transferable. Coursework from one college posted on the transcript of another college will not satisfy this requirement. Failure to acknowledge attendance and provide transcripts from all schools attended may be considered a fraudulent admissions application resulting in a denial of the application. A college transcript for dual credit coursework earned in high school must also be provided.
- Official paper transcripts are to be sent by the sending institution in a sealed envelope. The transcript will not be considered official if the student has had access to the actual transcript.
- Transcripts in a language other than English must be accompanied by an official English translation.
- Faxed copies are not official and will not be accepted.
- For students enrolled in the U.S., copies of official transcripts from other countries will be accepted provided the copies are on file and verified by the U.S. institution.

Lawful Permanent Residents of the United States

An applicant who has applied for or been granted Lawful Permanent Resident (LPR) status in the United States by the Department of Homeland Security (DHS) is eligible to submit an application as a Domestic Applicant. To qualify, you must include one of the following with the application:

- a copy of both sides of the DHS-issued Permanent Resident Card, or
- the I-551 Entry Stamp and Immigrant Visa in the passport, or
- an approved I-797 Notice of Action or I-797C Notice of Receipt.

If your parent is also a permanent resident, a copy of the parent’s proof of LPR status will be necessary to determine in-state residency for tuition purposes.

Note: If you have applied for adjustment of status to Lawful Permanent Residency and have not received your LPR card or Notice of Action that says Notice Type: Approval Notice, you are considered an international student once you are admitted to the University. There are certain requirements that international students must fulfill upon enrollment. Please contact International Student Services at iss@tamu.edu for more information about these requirements.

Required Immunizations

Texas Education Code (TEC) 51.9192 requires all entering students (under the age of 22) to provide evidence of vaccination against bacterial meningitis received within the last 5 years or a signed affidavit decling the vaccine at least 10 days prior to the start of classes for any given semester. Learn more about bacterial meningitis at http://admissions.tamu.edu/meningitis.aspx.

Notification of Application Status

Check the Applicant Information System (AIS) website in Howdy (http://howdy.tamu.edu), Applicant channel, to verify your application has been received and to determine if any credentials are missing. Please allow at least two weeks to process credentials.

The Office of Admissions will make every effort to inform applicants of incomplete files through AIS. If incomplete credentials are received within one month of the closing date, there may not be sufficient time for the Office of Admissions to notify applicants. All items necessary to complete an application must be received by the Office of Admissions by the closing date (not postmarked) to assure consideration for admission.

Required Coursework

Applicants who graduate from an accredited Texas public or private high school applying to Texas A&M University must have completed the Foundation High School Program preferably with the Distinguished Level of Achievement with at least one endorsement. The high school curriculum should be noted on the official high school transcript. Please visit http://admissions.tamu.edu/freshman/coursework for a complete description of coursework including information for home-schooled and out-of-state applicants.

State of Texas Uniform Admission Policy

Texas Education Code (TEC) 51.803-51.809 (State of Texas Uniform Admission Policy (http://admissions.tamu.edu/freshman/TexasUAP)) requires that all freshman applicants meet one of the following college readiness standards in order to be eligible to be considered for admission at a Texas four-year public institution.

- Satisfy the College Readiness Benchmarks on the SAT or ACT assessment; or
  - SAT – 1500 out of 2400 (Verbal + Math + Writing) for tests taken prior to March 2016
  - SAT - 480 EBRW and 530 Math for tests taken after February 2016
  - ACT – 18 English, 21 Reading, 22 Mathematics and 24 Science
• Successfully complete the State of Texas foundation, recommended or advanced/distinguished high school program or complete the portion of the program that was available to them; or
• Successfully complete a curriculum that is equivalent in content and rigor to the foundation, recommended or advanced/distinguished high school program at a high school that is exempt from offering such programs.

Freshman Admissions

Additional Information for Freshman Applicants

1. Information Presented in the Application
   • Extracurricular activities including time commitment and duration of involvement
   • Leadership and/or exceptional talent as shown in extracurricular activities and/or work
   • Community/volunteer work including time commitment and duration of involvement
   • Awards and achievements earned while in high school
   • Employment and/or internships including dates of work and hours per week
   • Family educational background and household income
   • Number of people in household

2. Essay Topics A and B

Topics A and B on the application are required. Essay Topic C is recommended for applicants in the holistic review process. Scholarship review by departments may utilize Essay Topics A, B and C in award decisions. Those applying for the Terry Scholarship are required to complete Essay Topic C. Applicants to the College of Engineering will be asked to answer an additional essay question as part of the application.

Freshman Admissions

When all credentials necessary to complete a freshman applicant’s file are received during the admission application period, one of the following criteria will be used to determine who will be offered admission:

1. Top 10% Applicants from Texas High Schools
   Applicants who are Texas residents or who are enrolled in recognized public or private high schools in Texas with a rank in the top 10% of their high school graduating class will be automatically admitted to Texas A&M University if they have successfully met the State of Texas Uniform Admission Policy and have successfully completed the recommended or distinguished graduation plan or the foundation distinguished plan. Choice of major is not guaranteed. These applicants must submit all required credentials by the closing date in order to qualify for automatic admission.

2. Academic Admits
   Applicants who rank in the top 25% of their high school graduating class, achieve a combined SAT Math and SAT Critical Reading score of at least 1300 on an SAT test taken prior to March 2016, with a test score of at least 600 in each of these components of the SAT, or achieve a combined SAT Math and SAT Evidence Based Reading and Writing (EBRW) score of at least 1360 on an SAT test taken after March 2016, with a minimum 620 Math and 660 EBRW score, or earn a composite ACT score of at least 30 with a test score of at least 27 in ACT Math and ACT English, have successfully completed all recommended coursework and have successfully met the State of Texas Uniform Admission Policy will be automatically admitted to Texas A&M University, but not necessarily to the major of choice. These applicants must submit all required credentials by the closing date to qualify for automatic admission.

3. Other Applicants
   Applicants not meeting the above requirements for automatic admission but who have met the state of Texas Uniform Admission Policy will have their complete application file reviewed in a holistic manner to make an admission decision.

Information for all Freshman Applicants

• All applicants should use the application questions and the essays to present their academic background and personal strengths as well as personal circumstances.
• Letters of recommendation are not required. If an applicant chooses to submit letters of recommendation, be sure they validate or certify leadership, exceptional talent or special circumstances. The most helpful letters are from individuals who know the applicant well and who can write about what distinguishes the individual from other applicants. Please submit no more than two letters of recommendation. Photocopies are acceptable.
• A competitive applicant who cannot be admitted to a major with restricted enrollment (Colleges of Architecture, Business, Education, Engineering, Liberal Arts, and Public Health) will be offered admission to their second major choice. If the second major choice is full, then an alternate major must be chosen after admission to the university.

Admission Decisions

Notice of Admission Decision

Texas A&M University receives many more academically prepared applicants for admission than we can accommodate. Admission decisions are made throughout the application period and announced as soon as possible. A final decision may not be announced until early December for spring admission or late March for summer or fall admission. A limited number of applicants may be offered provisional admission that requires the successful completion of a summer school program at Texas A&M. In addition, some applicants may be considered for the Texas A&M Blinn TEAM Program (http://blinn.team.tamu.edu), Texas A&M Engineering Academy at Blinn-Bryan (http://engineering.tamu.edu/academies/blinn-bryan), Texas A&M Engineering at Galveston (http://engineering.tamu.edu/academics/engineering-at-galveston), Texas A&M Engineering at McAllen (https://engineering.tamu.edu/academics/engineering-at-mcallen), or participation in the Program for System Admission (http://admissions.tamu.edu/PSA).

Suspected Fraudulent Admission Applications

Applicants for admission to Texas A&M University should be aware that the information submitted as part of the application process will be relied upon by University officials to determine their status for admission and residency for tuition purposes. By signing and submitting an admission application, the applicant certifies that the information in and submitted with the application is complete and correct and may be verified by Texas A&M University.

All students applying to Texas A&M University are expected to follow the Aggie Code of Honor which states “An Aggie does not lie, cheat or steal
nor tolerate those who do.” Applicants found to have misrepresented themselves or submitted false information on the application will receive appropriate disciplinary action which may include rejection of the application, withdrawal of any offer of acceptance, cancellation of enrollment or any other appropriate disciplinary action deemed necessary. In all instances of disciplinary action, the application fee is non-refundable.

Pursuant to the 2017-2018 undergraduate catalog and Texas A&M student rule 24.4.1 (http://student-rules.tamu.edu/rule24), acts of dishonesty include but are not limited to:

- Withholding material information from the University, misrepresenting the truth during a University investigation or student conduct conference, and/or making false statements to any University official.
- Furnishing false information to and/or withholding information from any University official, faculty member, or office.
- Forgery, alteration, or misuse of any University document, record, or instrument of identification.

For prospective undergraduate students (admitted but not enrolled), the initial determination of whether an individual has submitted a fraudulent application will be made by the Director of Admissions Operations, with a right of appeal to the Assistant Vice President for Academic Services and Director of Admissions for undergraduate students. All appeals will be considered by Admissions Decisions Appeals Committee and a recommendation made to the Assistant Vice President for Academic Services and Director of Admissions. For prospective graduate students, initial appeals will be made to the Dean of Graduate Studies.

Enrolled students suspected of violating Student Rules will be reported to the Student Conduct Office.

Any University official who suspects that a prospective student or enrolled student has submitted a fraudulent admission application must notify the Assistant Vice President for Academic Services and Director of Admissions.

**Residence Requirement for Baccalaureate Degree**

A student must complete at least 25% of semester credit hours applied to a baccalaureate degree in residence at Texas A&M University. A minimum of 36 semester credit hours of 300-level and higher coursework must be successfully completed in residence at Texas A&M University to obtain a baccalaureate degree. For the Bachelor of Science in Nursing - RN to BSN Track, a minimum of 30 semester credit hours of 300-level and higher coursework must be successfully completed in residence at Texas A&M University. In all cases, a minimum of 12 of these 36 semester hours must be in the major.

**Abbreviations for Texas A&M Colleges and Majors**

<table>
<thead>
<tr>
<th>College/Major</th>
<th>Abbrev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Systems Management</td>
<td>AGSM</td>
</tr>
<tr>
<td>Agriculture and Life Sciences</td>
<td>AGLS</td>
</tr>
<tr>
<td>Animal Science</td>
<td>ANSC</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>BICH</td>
</tr>
<tr>
<td>Bioenvironmental Sciences</td>
<td>BESC</td>
</tr>
<tr>
<td>Biological and Agricultural Engineering</td>
<td>BAEN</td>
</tr>
<tr>
<td>Ecological Restoration</td>
<td>ECOR</td>
</tr>
<tr>
<td>Entomology</td>
<td>ENTO</td>
</tr>
<tr>
<td>Environmental Studies</td>
<td>ENST</td>
</tr>
<tr>
<td>Food Science and Technology</td>
<td>FSTC</td>
</tr>
<tr>
<td>Forensic and Investigative Sciences</td>
<td>FIVL</td>
</tr>
<tr>
<td>Forestry</td>
<td>FORS</td>
</tr>
<tr>
<td>Genetics</td>
<td>GENE</td>
</tr>
<tr>
<td>Horticulture</td>
<td>HORT</td>
</tr>
<tr>
<td>Nutrition</td>
<td>NUTR</td>
</tr>
<tr>
<td>Plant and Environmental Soil Sciences</td>
<td>PSSC</td>
</tr>
<tr>
<td>Poultry Science</td>
<td>POSC</td>
</tr>
<tr>
<td>Rangeland Ecology and Management</td>
<td>RLEM</td>
</tr>
<tr>
<td>Recreation, Park and Tourism Sciences</td>
<td>RPTS</td>
</tr>
<tr>
<td>Renewable Natural Resources</td>
<td>RENR</td>
</tr>
<tr>
<td>Spatial Sciences</td>
<td>SPSA</td>
</tr>
<tr>
<td>Turfgrass Science</td>
<td>TGSC</td>
</tr>
<tr>
<td>University Studies</td>
<td>USAL</td>
</tr>
<tr>
<td>Wildlife and Fisheries Sciences</td>
<td>WFSC</td>
</tr>
<tr>
<td>College of Architecture</td>
<td>AR</td>
</tr>
<tr>
<td>Construction Science</td>
<td>COSL</td>
</tr>
<tr>
<td>Environmental Design Architectural Studies</td>
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</tr>
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<td>Landscape Architecture</td>
<td>LANL</td>
</tr>
<tr>
<td>University Studies</td>
<td>USAR</td>
</tr>
<tr>
<td>Urban and Regional Planning</td>
<td>URPN</td>
</tr>
<tr>
<td>Visualization</td>
<td>VISL</td>
</tr>
<tr>
<td>Mays Business School</td>
<td>BA</td>
</tr>
<tr>
<td>Business Administration (Accounting, Business Honors, Finance,</td>
<td>BUAD</td>
</tr>
<tr>
<td>Management, Management Information Systems, Marketing, Supply Chain</td>
<td></td>
</tr>
<tr>
<td>Management)</td>
<td></td>
</tr>
<tr>
<td>University Studies</td>
<td>USBU</td>
</tr>
<tr>
<td>College of Dentistry (Dallas campus)</td>
<td>DN</td>
</tr>
<tr>
<td>Dental Hygiene</td>
<td>DDHS</td>
</tr>
<tr>
<td>College of Education and Human Development</td>
<td>ED</td>
</tr>
<tr>
<td>Community Health</td>
<td>CHLL</td>
</tr>
<tr>
<td>Health (Health Education, Allied Health, School Health)</td>
<td>EDHL</td>
</tr>
<tr>
<td>Human Resource Development</td>
<td>HRDL</td>
</tr>
</tbody>
</table>
Interdisciplinary Studies (Early Childhood-6; Middle School) EDIS
Interdisciplinary Studies (Special Education, Bilingual) INST
Kinesiology (Physical Activity, Dance Science) EDKI
Secondary Education EDSM
Sport Management TCMC
Technology Management USEH
College of Engineering EN
Aerospace Engineering AERO
Biological and Agricultural Engineering BAEN
Biomedical Engineering BMEN
Chemical Engineering CHEN
Civil Engineering CVEN
Computer Engineering (Computer Science track) CECN
Computer Science CPSC
Electrical Engineering ELEN
Electronic Systems Engineering Technology ESET
Industrial Distribution IDIS
Industrial Engineering INEN
Interdisciplinary Engineering ITDE
Manufacturing & Mechanical Engineering Technology MMET
Mechanical Engineering MEEN
Multidisciplinary Engineering Technology MXET
Nuclear Engineering NUEN
Ocean Engineering OCEN
Petroleum Engineering PETE
College of Geosciences GE
Environmental Geosciences ENGS
Environmental Studies ENST
Geographic Information Science and Technology GIST
Geography GEOG
Geology GEOL
Geophysics GEOP
Meteorology METL
Oceanography OCN
University Studies USGE
College of Liberal Arts LA
Anthropology ANTH
Classics CLSS
Communication COMM
Economics ECON
English ENGL

History HIST
International Studies INTS
Modern Languages (French, German, Russian) MODL
Performance Studies PERF
Philosophy PHIL
Political Science POLS
Psychology PSYC
Sociology SOCI
Spanish SPAN
Telecommunication Media Studies TCMS
University Studies USLA
Women's and Gender Studies WGST
College of Nursing NU
Nursing NURS
School of Public Health PHTL
Public Health PHTL
College of Science SC
Applied Mathematical Sciences APMS
Biology BIOL
Chemistry CHEM
Mathematics MATH
Microbiology MBIO
Molecular and Cell Biology BMCB
Physics PHYS
Statistics STAT
University Studies USSC
Zoology ZOOL
College of Veterinary Medicine and Biomedical Sciences VM
Biomedical Sciences BIMS
University Studies USVM

1. See this catalog pertaining to your major for the specific science.
2. Choice available for transfer applicants only. Nursing and Dental Hygiene applicants must have completed or be enrolled in prerequisite courses at the time of application. Courses may be completed at any accredited college or university.
3. All new students to the Colleges of Architecture, Business, and Public Health enter the lower level.
4. Requires CHEM 102; MATH 141, MATH 151.
5. The curriculum leading to a professional degree in Architecture begins in the four-year undergraduate Environmental Design Architectural Studies degree program. This degree provides entry to the Master of Architecture program.
6. No spring transfer admission.
7. Choice not available for transfer applicants.
8. All students seeking elementary teacher certification will complete a baccalaureate degree in Interdisciplinary Studies. There is no major in Secondary Teacher Education. All students seeking secondary certification (except those preparing to teach physical education or health) will major in an academic discipline other than education (i.e., mathematics, English, computer science, biology, etc.) and take appropriate coursework for teacher certification in the College of Education and Human Development.
Change of Curriculum to Another Campus

Texas A&M offers certain undergraduate degrees at two branch campuses in addition to the main campus. While enrolled as a student in residence at any one of the Texas A&M locations, students may apply for a change of curriculum to another campus for a future semester. Students must comply with the established change of curriculum procedures and requirements of their desired major, department, and college, and space must be available. Final approval is granted by the academic dean or departmental advisor for that major.

Transfer Admissions

Transfer Admissions

Transfer applicants will be reviewed and receive a decision from the college/major to which they have applied. Prospective applicants are encouraged to follow the curriculum and guidelines outlined by that specific college/major.

With the changes to the 2014-2015 University Core Curriculum, the Degree Tracks previously used for transfer admission are no longer valid. Recommended/required coursework for desired majors is available on the Transfer Course Sheets at http://admissions.tamu.edu/transfer/majors. It is to a student’s advantage to follow the guidelines and complete courses as outlined on the Transfer Course Sheets and in the catalog. Applicants who begin a set of courses which have a two-semester sequence are encouraged to complete both courses in the sequence before planning to transfer to Texas A&M.

Admission Criteria

- Transfer applicants must have at least a 2.5 grade point ratio (GPR) on at least 24 graded semester hours of transferable coursework at the time of application to be reviewed for admission.
- Students with less than a 2.5 GPR and/or less than 24 graded transferable hours will be denied admission and will not be sent to the academic college for review.
- Transfer admission decisions are made by the college and major and are competitive; thus, admission standards may change from one semester to another. Preference is given to the applicant with the highest grade point ratio (GPR) and the most courses completed for the major designated on the application. See the College Specific Information for the college of the major for which you applied.
- Applicants who drop or withdraw from courses frequently and who do not routinely achieve satisfactory grades will be at a disadvantage in the review for admission.
- Spring grades may be used in the fall admission decision if requested by the Academic College or in instances where the student did not meet the university requirements for review. Spring transcripts must be received by June 1 for review with spring grades. A complete application must be on file by March 1 to be considered for fall admission and to qualify for spring grade review. Spring grade review is not an option for students studying outside the U.S.
- The entire application, including essay topic A, is considered to identify admissible candidates.
- Some colleges consider second choice majors. While such admissions may be more competitive since they are made after applicants indicating that major as first choice, the admission decision follows the guidelines for that college presented in College Specific Information. Note that several colleges do not consider second choice majors.

Automatic Transfer Admission through SB 175

A transfer applicant who graduated from a Texas high school and ranked in the top 10% of the student’s high school qualifies for automatic transfer admission to a 4-year university under the provisions of SB 175 if they meet the following guidelines:

1. The applicant must have graduated in the top 10% of his or her high school graduating class from a Texas high school not more than 4 years prior to the semester for which the student is applying. The top 10% ranking must be stated on the final high school transcript, or the applicant must have been previously offered admission under the top 10% rule to the institution to which the applicant seeks admission as a transfer student.
2. The applicant must complete the core curriculum at a public junior college or other public or private lower-division institution with a 2.5 GPR on a four-point scale or equivalent.
3. Transcript should note core completion.
4. The applicant must expressly and clearly claim in the application that he or she is seeking admission under the transfer top 10% rule (SB 175).
5. The applicant must provide all of the documents required for transfer admission to Texas A&M by the posted deadline. Transfer requirements can be found at http://admissions.tamu.edu/transfer.

Applicants qualifying for transfer top 10% admission under SB 175 will be admitted to Texas A&M but the choice of major is not guaranteed. Students desiring admission to Business or Engineering are encouraged to select a second choice major of interest due to the limited enrollment capacity in these colleges.

For information concerning the Transfer Top 10% Admission, please see www.legis.state.tx.us/tlodocs/81R/billtext/doc/SB00175F.doc.

College Specific Information

College of Agriculture and Life Sciences

Transfer admission requirements vary greatly across the College. Admission decisions are made by major and are competitive. Most majors have a series of required and preferred coursework to be completed by the student prior to application. It is highly recommended that prospective students contact the academic advisor for the major of interest to inquire about specific transfer admission requirements. Students should also refer to the Texas A&M University Admissions (http://admissions.tamu.edu) website to review the transfer guides for each major. Also, note that transfer admission GPR requirements vary by major and several exceed the minimum 2.5 GPR. Completion of the essay indicating why the major was selected and how a degree in this major will help meet career goals is required. For more information on transfer guidelines, coursework and contact information for all academic advisors, refer to the College of Agriculture and Life Sciences (http://aglifesciences.tamu.edu) website.
College of Architecture

Applicants must have completed 24 hours of transferable coursework at the time of application, and it is recommended that these courses be selected from the degree program electives described elsewhere in this catalog. The essay is an important component in the review process and should explain why the applicant is interested in either the Construction Science, Environmental Design Architectural Studies, Landscape Architecture, Urban and Regional Planning or Visualization program. Applicants with less than a 3.0 GPR are rarely admitted. For more information, visit the College of Architecture (http://www.arch.tamu.edu) website.

Enrollment in Environmental Design Architectural Studies and Visualization is driven by available studio space. Additionally, there are eight sequential studios in those degree programs which make it difficult for students that transfer with more than 36 hours.

### Recommended Coursework

<table>
<thead>
<tr>
<th>Degree</th>
<th>Applicable Majors</th>
<th>Courses</th>
<th>TCCNS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban and Regional Planning,</td>
<td>Landscape Architecture,</td>
<td>ENGL 104, MATH 141, PHYS 201 or</td>
<td>ENGL 1301,</td>
</tr>
<tr>
<td>Landscape Architecture</td>
<td>University Studies</td>
<td>CHEM 101 or PHYS 1102 or</td>
<td>MATH 1324,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PHYS 1302</td>
</tr>
<tr>
<td>Environmental Design</td>
<td>Environmental Design</td>
<td>ENGL 104, MATH 141, PHYS 201</td>
<td>ENGL 1301</td>
</tr>
<tr>
<td>Architectural Studies,</td>
<td>Architectural Studies,</td>
<td></td>
<td>MATH 1324,</td>
</tr>
<tr>
<td>Construction Science</td>
<td>Construction Studies</td>
<td></td>
<td>PHYS 1302</td>
</tr>
<tr>
<td>Visualization</td>
<td>Visualization</td>
<td>ENGL 104, MATH 151, PHYS 201</td>
<td>ENGL 1301</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MATH 2413,</td>
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<td></td>
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<td></td>
<td>MATH 1302</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>PHYS 1102</td>
</tr>
</tbody>
</table>

1 MATH 1324 from some colleges will not be a direct equivalent to MATH 141 at Texas A&M University but will satisfy the core math requirement for this major.

Mays Business School

Mays Business School offers transfer admission to the most competitive applicants. The transfer admission process identifies applications that evidence outstanding accomplishments, including academic credentials using the following guidelines.

Transfer admission to Mays generally requires excellence in the following set of eight specific courses. Applicants desiring to major in business are encouraged to plan early, and incorporate this entire body of coursework into their curriculum prior to applying. It is especially important to have credit for both required math courses before applying.

Mays admits transfer applicants for summer or fall admission. Spring transfer admission is not available. Applicants are expected to have completed and excelled in substantially all of the 24 semester hours of Recommended Coursework. Due to the competitiveness of the applicant pool, successful applicants will have a combination of As and Bs in this coursework and a high overall GPR.

The entire application is reviewed. Successful applicants include carefully written essays that demonstrate clarity of purpose, creativity, and an advanced writing style. Applicants are encouraged to identify their intended upper-level major and to describe why they are well suited for that area of specialization. Applicants who have special circumstances they wish to discuss are urged to share all pertinent information, with appropriate documentation, in their essay(s).

RECOMMENDED COURSEWORK FOR ADMISSION: Priority courses to be completed before transfer application to Mays Business School are:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>TCCNS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting - Financial</td>
<td>ACCT 2301, ACCT 2401</td>
</tr>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting - Managerial</td>
<td>ACCT 2302, ACCT 2402</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics - Microeconomics</td>
<td>ECON 2302</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics - Macroeconomics</td>
<td>ECON 2301</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>SPCH 1315</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>ENGL 1302</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>MATH 1324</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business - Calculus</td>
<td>MATH 1325</td>
</tr>
</tbody>
</table>

1 In lieu of MATH 1324 and MATH 1325, Mays accepts MATH 2414 and MATH 2413, respectively.

College of Education and Human Development

The College of Education and Human Development (CEHD) is actively seeking qualified transfer students who are interested in teacher certification. There is a nationwide demand for teachers. In particular, the College is seeking students interested in high-need teaching fields: math, science, special education, bilingual, English as a Second Language, and foreign language. The College also offers a variety of non-certification programs.

To be competitive for admission, an applicant should, at the time of application, have a minimum 2.75 GPR on at least 24 hours of graded transferable coursework. It is preferred that MATH 141/MATH 1324, MATH 142/MATH 1325 and two science courses from the desired major be taken prior to application. Students specifically interested in Allied Health or Kinesiology Exercise Science should complete both math and both science courses with a grade of “B” or better and maintain a cumulative 3.0 GPR across all transferable coursework in order to be competitive in the applicant pool.

Students interested in certification at grades 8–12 should complete a baccalaureate degree in a discipline area and contact the College regarding certification. The College of Education and Human Development does not consider second-choice majors.

Recommended Courses. Prospective transfer students should refer to the College of Education and Human Development (http://education.tamu.edu) website to identify additional courses that will satisfy degree requirements. Any student applying for a degree in Allied Health or Kinesiology is encouraged to apply with under 60 total hours of
transfer credit. Applicants should refer to the College website for more information.

The College of Education and Human Development evaluates performances in all courses and considers all parts of the application. If you have repeatedly dropped or withdrawn from courses or if you are taking courses that do not apply to the Core Curriculum or your major, they may have a negative impact when the application is reviewed. A well-written essay is a student’s opportunity to share information and experiences that could indicate success in a particular major.

The college has identified the following 31 hours of coursework as transferable for all CEHD majors:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>TCCNS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Intro. to Biology</td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Intro. to Rhetoric and Composition</td>
<td></td>
</tr>
<tr>
<td>HIST 105 or HIST 106</td>
<td>American History</td>
<td>HIST 1301 or HIST 1302</td>
</tr>
<tr>
<td>HIST 226</td>
<td>History</td>
<td>HIST 2301</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Business Math I</td>
<td>MATH 1324</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Math II</td>
<td>MATH 1325</td>
</tr>
<tr>
<td>THAR 101</td>
<td>Intro. to Western Theatre and Drama</td>
<td>DRAM 1310</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American Government</td>
<td>GOVT 2305</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>GOVT 2306</td>
</tr>
</tbody>
</table>

1 MATH 1324 from some colleges will not be a direct equivalent to MATH 141 at Texas A&M University but will satisfy the core math requirement for this major.

Guidelines for Transfer Applicants by Program

Health. Applicants who are seeking transfer admission to this program should complete BIOL 1406, CHEM 1411, MATH 1324 and MATH 1325 for admission. Other prerequisite coursework that is recommended is SPCH 1315; and PHED 1304. Students may also take BIOL 2401 and BIOL 2402 to substitute for BIOL 319 and BIOL 320 for this option. Students specifically interested in Allied Health should complete both math courses with grades of "B" or better and at least two of the available science courses listed with grades of "B" or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

Kinesiology–Exercise Science. Students in this program are encouraged to complete at least 24 hours of the science coursework prior to the 60 completed hours. The Texas Common Course Numbers for the required science coursework on the exercise science degree plan (Applied Exercise Physiology, Basic Exercise Physiology and Motor Behavior options in the Kinesiology degree) are BIOL 1406, BIOL 1407, CHEM 1411, CHEM 1412, PHYS 1401 and PHYS 1402. The remaining 8 hours (Anatomy and Physiology I and II) must be taken at Texas A&M. Other coursework that students could complete include MATH 1324 and MATH 1325 (required for transfer); ENGL 2311 or SPCH 1315; and PHED 1301. Students should complete both math courses with grades of "B" or better and at least two of the available science courses listed with grades of "B" or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

Kinesiology–Physical Education Teacher Certification. Applicants who are seeking transfer admission to this program should complete BIOL 1406, PHYS 1401, MATH 1324 and MATH 1325. Other prerequisite coursework that can be taken prior to admission to Texas A&M and the program and is recommended is ENGL 1301 or ENGL 2311; and PHED 1301. Students may also take BIOL 2401 and BIOL 2402 to substitute for BIOL 319 and BIOL 320 for this option.

Sport Management. Applicants who are seeking transfer admission to this program should complete two lab sciences that meet TAMU Core Curriculum which could consist of the following science courses: BIOL 1406, GEOL 1403, CHEM 1411 or PHYS 1401. Check with the Office of Admissions for specific courses that may meet this requirement.

Math courses with grades of “B” or better and at least two of the available science courses with grades of “B” or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

The MATH 151, MATH 152 and MATH 251 sequence can also be satisfied by completing the TCCNS sequence of four 3-hour courses (MATH 2313, MATH 2314, MATH 2315, MATH 2316). It is intended that applicants finish their calculus sequence, and not intended that applicants mix courses between two different calculus sequences. 

Applicants specifically interested in Allied Health should complete both math courses with grades of “B” or better and at least two of the available science courses listed with grades of “B” or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

College of Engineering

Applicants should complete at least 24 hours of graded transferable coursework at the time of submitting their application, all with a grade of C or better. Transfer admission GPA requirements vary by major, with the majority exceeding the minimum requirements for transfer admission consideration to Texas A&M. Transfer admission course requirements also vary by major. Successful applicants for undergraduate engineering degree programs in the College of Engineering will have completed all or most of the coursework listed before applying for transfer admission. Prospective transfer students should review prospective student information accessed through the College of Engineering (http://engineering.tamu.edu) website for more information and details specific to each major.

Guidelines for Transfer Applicants by Program

Health. Applicants who are seeking transfer admission to this program should complete BIOL 1406, CHEM 1411, MATH 1324 and MATH 1325 for admission. Other prerequisite coursework that is recommended is SPCH 1315; and PHED 1304. Students may also take BIOL 2401 and BIOL 2402 to substitute for BIOL 319 and BIOL 320 for this option. Students specifically interested in Allied Health should complete both math courses with grades of "B" or better and at least two of the available science courses listed with grades of "B" or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

Kinesiology–Exercise Science. Students in this program are encouraged to complete at least 24 hours of the science coursework prior to the 60 completed hours. The Texas Common Course Numbers for the required science coursework on the exercise science degree plan (Applied Exercise Physiology, Basic Exercise Physiology and Motor Behavior options in the Kinesiology degree) are BIOL 1406, BIOL 1407, CHEM 1411, CHEM 1412, PHYS 1401 and PHYS 1402. The remaining 8 hours (Anatomy and Physiology I and II) must be taken at Texas A&M. Other coursework that students could complete include MATH 1324 and MATH 1325 (required for transfer); ENGL 2311 or SPCH 1315; and PHED 1301. Students should complete both math courses with grades of "B" or better and at least two of the available science courses listed with grades of "B" or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

Kinesiology–Physical Education Teacher Certification. Applicants who are seeking transfer admission to this program should complete BIOL 1406, PHYS 1401, MATH 1324 and MATH 1325. Other prerequisite coursework that can be taken prior to admission to Texas A&M and the program and is recommended is ENGL 1301 or ENGL 2311; and PHED 1301. Students may also take BIOL 2401 and BIOL 2402 to substitute for BIOL 319 and BIOL 320 for this option.

Sport Management. Applicants who are seeking transfer admission to this program should complete two lab sciences that meet TAMU Core Curriculum which could consist of the following science courses: BIOL 1406, GEOL 1403, CHEM 1411 or PHYS 1401. Check with the Office of Admissions for specific courses that may meet this requirement.

Math courses with grades of “B” or better and at least two of the available science courses with grades of “B” or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

The MATH 151, MATH 152 and MATH 251 sequence can also be satisfied by completing the TCCNS sequence of four 3-hour courses (MATH 2313, MATH 2314, MATH 2315, MATH 2316). It is intended that applicants finish their calculus sequence, and not intended that applicants mix courses between two different calculus sequences. 

Applicants specifically interested in Allied Health should complete both math courses with grades of “B” or better and at least two of the available science courses listed with grades of “B” or better. It is preferred that these students also maintain a minimum 3.0 cumulative GPR across all courses that transfer to Texas A&M University.

College of Engineering

Applicants should complete at least 24 hours of graded transferable coursework at the time of submitting their application, all with a grade of C or better. Transfer admission GPA requirements vary by major, with the majority exceeding the minimum requirements for transfer admission consideration to Texas A&M. Transfer admission course requirements also vary by major. Successful applicants for undergraduate engineering degree programs in the College of Engineering will have completed all or most of the coursework listed before applying for transfer admission. Prospective transfer students should review prospective student information accessed through the College of Engineering (http://engineering.tamu.edu) website for more information and details specific to each major.
### Applicable Majors

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
</table>

Environmental Studies (ENST) B.S.
- At least one course selected from: GEOG 1302, 1303, GEOE 102 and 103, 1103, 1104, 1403 or other introductory courses in the Geosciences (Geography, Geology, Atmospheric Science; Oceanography) Two Math courses: MATH 1324 and 1325 One Science course selected from: BIOL 1001 and 1106, 1406 CHEM 1311 and 1111, 1112, 1411, 1412

Geography (GEOG) B.S.
- University Studies - Geography (USGE) B.S.
- Geographic Information Science and Technology (GIST) B.S.

Geology (GEOL) B.A.
- GEOL 1303 and 1103 or 1403 Two Math courses: MATH 1324 and 1325 One Science course selected from: BIOL 1306 and 1106, 1406 CHEM 1311 and 1111, 1112, 1411, 1412

Geology (GEOL) B.S.
- GEOL 1303 and 1103 or 1403 These four Math/Science courses: MATH 2413, 2414, CHEM 1411, 1412

Geophysics (GEOG) B.S.
- GEOL 1303 and 1103 or 1403 These four Math/Science courses: MATH 2413, 2414, PHYS 2325 and 2125, PHYS 2326 and 2126

Meteorology (METR) B.S.
- MATH 2413, 2414; PHYS 2425, CHEM 1411, 1412 (These courses must be completed with a B or better.)

Oceanography (OCNG) B.S.
- MATH 2413, 2414; CHEM 1411, 1412; PHYS 2325, 2326; BIOL 1106, 1107 (These courses must be completed with a C or better.)

Geophysical Oceanography (GEOG) B.S.
- Oceanography (GEOG) B.S.

Geophysical Oceanography (GEOG) B.S.
- Oceanography (GEOG) B.S.

Geological Engineering and Chemical Engineering require Fundamentals of Chemistry I (CHEM 111 – TCCNS CHEM 1411) and Fundamentals of Chemistry II (CHEM 112 – TCCNS CHEM 1412). All other majors in the College, except computer science, require CHEM 107/117. Students attending an institution without an equivalent to CHEM 107/117 can transfer an equivalent to CHEM 102/112 to fulfill the CHEM 107/117 requirement. Computer Science does not require CHEM for their degree plan but CHEM 101/111 and CHEM 102/112 can be used toward an approved science requirement.

### College of Geosciences

Prospective freshman and transfer applicants are encouraged to refer to the College of Geosciences (http://geosciences.tamu.edu) website for details on appropriate coursework for their intended major. Special attention is paid to performance on required math and science courses and to the essay portion of the application. Fall and spring admission preferred. The College of Geosciences will consider second-choice majors.

Overall, the College of Geosciences requires prospective transfer students to be in the process of completing a minimum of 24 hours from the list of courses provided here with a minimum overall GPA of 2.5. Applicants are expected to have demonstrated successful completion of this body of coursework, to present evidence of success in a course in their selected major, and in the mathematics and science courses specified.

The entire application submitted by transfer students is reviewed. Successful applicants include carefully written essays that demonstrate clarity of purpose and an advanced writing style. In the essay, applicants are advised to identify their intended major within the College of Geosciences and to describe why they are committing to study that subject. Applicants who have special circumstances they wish to share are encouraged to address these within the body of the essay(s), which are held in strict confidence.

Each major requires the courses as listed below:

### College of Science

Applicants should complete 24 hours, as appropriate to the choice of major, with a cumulative GPR of at least 3.0. Strength of schedule is a factor in determining admission. Applicants will not be admitted without the completion of the first two semesters of courses in their declared major with a grade of B or better. Chemistry and Physics majors must also complete 8 hours of Calculus I and II with a grade of B or better. Biology students must complete 8 hours of Chemistry I and II with a grade of B or better and Calculus I and II with a grade of C or better. The College of Science will consider second-choice majors. Students with 90 hours of college credit will not be considered for transfer admission. For more information, visit the College of Science (http://www.science.tamu.edu) website.

The transfer admission guidelines by major in the College of Science include:

- Biomedical Engineering and Chemical Engineering require Fundamentals of Chemistry I (CHEM 111 – TCCNS CHEM 1411) and Fundamentals of Chemistry II (CHEM 112 – TCCNS CHEM 1412). All other majors in the College, except computer science, require CHEM 107/117. Students attending an institution without an equivalent to CHEM 107/117 can transfer an equivalent to CHEM 102/112 to fulfill the CHEM 107/117 requirement. Computer Science does not require CHEM for their degree plan but CHEM 101/111 and CHEM 102/112 can be used toward an approved science requirement.

- The entirety of the application submitted by transfer students is reviewed. Successful applicants include carefully written essays that demonstrate clarity of purpose and an advanced writing style. In the essay, applicants are advised to identify their intended major within the College of Geosciences and to describe why they are committing to study that subject. Applicants who have special circumstances they wish to share are encouraged to address these within the body of the essay(s), which are held in strict confidence.

- Each major requires the courses as listed below:

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</tr>
<tr>
<td>Environmental Geosciences (ENG) B.S.</td>
<td>At least one course selected from: GEOG 1302, 1303, GEOE 102 and 103, 1103, 1104, 1403 or other introductory courses in the Geosciences (Geography, Geology, Atmospheric Science, Oceanography) Two Math courses: MATH 2413 and 2414 One Science course selected from: BIOL 1306 and 1106, 1406 CHEM 1311 and 1111, 1112, 1411, 1412 PHYS 1301 and 1101, 1401</td>
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<td>Geography (GEOG) B.S.</td>
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<td>Geology (GEOL) B.A.</td>
<td>GEOL 1303 and 1103 or 1403 Two Math courses: MATH 1324 and 1325 One Science course selected from: BIOL 1306 and 1106, 1406 CHEM 1311 and 1111, 1112, 1411, 1412 PHYS 1301 and 1101, 1401</td>
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<td>Geophysics (GEOG) B.S.</td>
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<td>Meteorology (METR) B.S.</td>
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<td>Oceanography (OCNG) B.S.</td>
<td>MATH 2413, 2414; CHEM 1411, 1412; PHYS 2325, 2326; BIOL 1106, 1306 (These courses must be completed with a C or better.)</td>
</tr>
</tbody>
</table>

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4 Biomedical Engineering and Chemical Engineering require Fundamentals of Chemistry I (CHEM 101/111 – TCCNS CHEM 1411) and Fundamentals of Chemistry II (CHEM 102/112 – TCCNS CHEM 1412). All other majors in the College, except computer science, require CHEM 101/111. Students attending an institution without an equivalent to CHEM 101/111 can transfer an equivalent to CHEM 102/112 to fulfill the CHEM 101/111 requirement. Computer Science does not require CHEM for their degree plan but CHEM 101/111 and CHEM 102/112 can be used toward an approved science requirement.
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<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>BIOL 1307 and 1107, 1407</td>
</tr>
<tr>
<td>CHEM 101/CHEM 111</td>
<td>Fund. of Chem. I/Lab</td>
<td>CHEM 1311 and 1111, 1411</td>
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<td>CHEM 102/CHEM 112</td>
<td>Fund. of Chem. II/Lab</td>
<td>CHEM 1312 and 1112, 1412</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Math I</td>
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</tr>
<tr>
<td>MATH 152</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>ENGL 1302</td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the U.S.</td>
<td>HIST 1301</td>
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<td>Composition and Rhetoric</td>
<td>ENGL 1302</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Scientific/Technical Writing</td>
<td>ENGL 2311</td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the United States</td>
<td>HIST 1301</td>
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</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>PHYS 2325 and 2125, 2425</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity</td>
<td>PHYS 2326 and 2126, 2426</td>
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<tr>
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<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>SPCH 1315</td>
</tr>
<tr>
<td>CSCE 206</td>
<td>Structured Programming in C</td>
<td>BCIS 1420, COSC 1420</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>PHYS 2326 and 2126, 2426</td>
</tr>
</tbody>
</table>

1. A grade of B or better is required on all courses. Requirements also include a cumulative GPA of 3.00 or better.
2. Must be completed with a C or better.
3. Meets major requirement. May be taken as time permits.

### College of Veterinary Medicine and Biomedical Sciences

Applicants should have a 3.00 GPR on at least 45 hours of graded transferable coursework at the time of application and meet all Common Body of Knowledge (CBK) requirements for Biomedical Sciences in order to be considered for admission into Biomedical Sciences. Students who begin a set of courses which have a two-semester sequence are encouraged to complete both courses in the sequence before transferring to Texas A&M. No second-choice majors are considered. No summer admissions accepted. For more information, visit the College of Veterinary Medicine and Biomedical Sciences website.

Transfer students with 45 or more hours completed at the time of application will be given preference in admission. The transfer into Biomedical Sciences must occur before the student reaches 75 completed hours. All CBK courses should have a minimum grade of a "C". Any CBK courses transferred in from a community college must have a minimum grade of a "B".

Readmits will require a 3.0 at Texas A&M University and all CBK courses completed with at least a "C" in all courses. Any CBK courses transferred in from a community college must have a minimum grade of a "B".

### CBK Requirements

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<td>CHEM 101/CHEM 111</td>
<td>Fundamentals of Chem. I</td>
<td>CHEM 1311 and 1111, 1411</td>
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<tr>
<td>CHEM 102/CHEM 112</td>
<td>Fundamentals of Chem. II</td>
<td>CHEM 1312 and 1112, 1412</td>
</tr>
<tr>
<td>CHEM 227/CHEM 237</td>
<td>Organic Chem. I/Lab</td>
<td>CHEM 2323 and 2123, 2423</td>
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<tr>
<td>CHEM 228/CHEM 238</td>
<td>Organic Chem. II/Lab</td>
<td>CHEM 2325 and 2125, 2425</td>
</tr>
<tr>
<td>MATH 131</td>
<td>Calculus</td>
<td>PHYS 1301 and 1101, 1401</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics I</td>
<td>PHYS 1301 and 1101, 1401</td>
</tr>
</tbody>
</table>
Transfer Course Credit Policies

Transfer credit on coursework complete at the time of application to Texas A&M University is determined when an official transcript from the originating institution is presented as part of the application for admission or readmission process. An official transcript is required from every post-secondary institution attended (including dual credit earned in high school) even if the applicant did not earn credit, receive a course grade or the course is not transferable.

The transfer of course credit will be determined by the Office of Admissions on a course-by-course basis. Credit submitted for transfer must be on an official transcript received by the Office of Admissions from the registrar of the institution where the credit was earned. Course content will be determined from the catalog description or the syllabus. The transferability of credit will be based on the criteria below. All criteria are intended to be considered together; for example, criteria 10 may be qualified by criteria 7.

Credit from Institutions Accredited by One of the Regional Accrediting Associations

1. A course that is normally considered as part of a bachelor’s degree program (not including the bachelor of technology or similar terminal degree) may be transferred. The following criteria, taken together, are used:
   a. The course is applicable to a bachelor’s degree at Texas A&M.
   b. The course is similar to a course or courses offered for degree credit by Texas A&M.
   c. The course content is at or above the level of the beginning course in the subject matter offered by Texas A&M.

2. A course that is intended for use in a vocational, technical or occupational program will normally not transfer. In certain cases, credit for occupational skill courses will be considered. Transfer of this credit requires either that the student’s Texas A&M major is engineering technology or industrial distribution or that the student’s major department and dean approve the course for use in the student’s degree program after enrollment.

3. Credit for support courses such as Math, Science and English intended specifically for use in an occupational program will not be transferred.

4. Credit for the course must be shown on the official transcript in semester hours or in units that are readily converted to semester hours.

5. A graduate-level course will not be transferred for undergraduate credit unless approved for use in the student’s undergraduate degree program by the student’s major department and Dean. This also applies for a course offered in a professional degree program such as Nursing, Law, or Medicine.

6. Credit by examination courses which are transcripted from other colleges or universities may be transferred if sequential coursework with credit is also indicated. If there is evidence that the credit by examination courses are part of the student’s program of study at that institution, credit will be awarded for those courses that meet the transfer guidelines. Note: Credit by examination will not count toward the 24 hours required for consideration for admission.

7. Courses similar to ones offered by the Colleges of Agriculture and Life Sciences, Business, Engineering or Geosciences at the junior or senior level transfer by title only. Such courses may be used in the student’s degree program only if approved by the Department Head and Dean of the student’s major field. Validation of such credit, either by examination or the completion of a higher level course, may be required.

8. A field experience, internship or student teaching course may be transferred by title only.

9. Credit for cooperative education will not be transferred.

10. A course that is substantially equivalent to a Texas A&M course transfers as an equivalent course. Two or more courses may be combined to form one or more equivalent courses. If there is doubt about the equivalency of a course, the Texas A&M department offering the course subject matter may be asked to determine if the course is equivalent.

11. As a general policy, credit for admission will be given for transfer work satisfactorily completed with a passing grade at another properly accredited institution.

12. Grade Point Ratio (GPR) for any period shall be computed by dividing the total number of semester hours of transferable courses for which the student received grades into the total number of grade points earned in that period. Credit hours to which grades equivalent to
Texas A&M grades of W, WF, F, I or U are assigned shall be included; those having grades equivalent to Texas A&M grades of WP, Q, S, X and NG shall be excluded.

13. In any case where a decision cannot be made using the above criteria, the Office of Admissions will determine the transfer of credit based on University policy, previous actions of the University and prior experience.

Resolution of Transfer Disputes for Lower Division Courses Between Public Institutions in Texas

The following procedures shall be followed by public institutions of higher education in the resolution of credit transfer disputes involving lower-division courses:

1. If an institution of higher education does not accept course credit earned by a student at another institution of higher education, the receiving institution shall give written notice to the student and to the sending institution that transfer of the course credit is denied. A receiving institution shall also provide written notice of the reasons for denying credit for a particular course or set of courses at the request of the sending institution.

2. A student who receives notice as specified in subsection 1 may dispute the denial of credit by contacting a designated official at either the sending or the receiving institution.

3. The two institutions and the student shall attempt to resolve the transfer of the course credit in accordance with the rules and guidelines of the Texas Higher Education Coordinating Board (THECB).

4. If the transfer dispute is not resolved to the satisfaction of the student or the sending institution within 45 days after the date the student received written notice of denial, the institution that denies the course credit for transfer shall notify the Commissioner of its denial and the reasons for the denial.

The Commissioner of Higher Education or the Commissioner’s designee shall make the final determination about the dispute concerning the transfer of course credit and give written notice of the determination to the involved student and institutions.

Credit from Non-accredited Schools

Students who transfer to Texas A&M from an institution of higher education that is not accredited by one of the regional accrediting associations may validate the work taken at the institution by one of the following methods:

1. Successful completion of a comprehensive departmental examination or nationally standardized examination that is approved by the department.

2. Successful completion of a higher level course in the same subject area when approved by the head of the department and the dean of the college.

Credit will be given to students transferring from non-accredited public colleges in Texas for work completed with grades of C or better if they earn a grade point of 2.0 (C average) on the first 30 hours of residence work at Texas A&M.

Credit from Foreign Institutions

Transfer work from institutions following other than the United States educational system with instruction in English will be evaluated on an individual basis. A-level examinations with a grade of C or better will transfer. Baccalaureate II examinations will not transfer; however, these students may take placement and proficiency examinations to receive credit by examination. Credit will be given for work satisfactorily completed at international institutions offering programs recognized by Texas A&M. Official credentials submitted directly from the office of the Registrar and a listing of courses completed and grades awarded must accompany any request for transfer credit. Transfer work will be awarded by course title unless previous arrangements have been made using the Texas A&M University Transfer Credit Study Abroad Pre-Approval Form. Courses must be equivalent in character and content to courses offered at Texas A&M. Credit will not be awarded from international institutions which are not academically accredited by the Ministry of Education or other appropriate authority in the home country.

No English composition courses will be transferred from institutions located in non-English speaking countries. American history and American political science (government) courses will not transfer from foreign institutions.

Courses taken at language training centers or institutes are generally not awarded transfer credit. A transcript from such an institution must be issued through the office of the Registrar at a Texas A&M recognized university, institute or language training center. Credentials of all language training centers and institutes are carefully checked.

Credit for Military Experience

State law (Texas Education Code Section 51.3042) and Texas A&M University policy awards credit for military service to eligible veterans. To receive credit, student veterans must submit proof of eligibility to the Office of Admissions. Up to 12 hours of general elective credits may be awarded, as needed for the student’s degree plan.

Proof of eligibility includes:

- DD Form 214 showing 1 year active duty and an honorable discharge
- Military orders
- Disability discharge documentation
- Documentation of high school completion (final high school transcript or General Educational Development certificate)

Military transcripts are evaluated at the time of application and credit for military experience/training is awarded based on recommendations contained within the Guide to the Evaluation of Educational Experiences in the Armed Services published by the American Council on Education (ACE). Texas A&M University will award KINE 198 and KINE 199 credit for completion of Basic Training. Credit under this policy does not prohibit Texas A&M University from awarding additional credit. The Military Transcript Credit Appeal form shall be provided to the Office of Admissions with approval of the academic advisor and veteran.

Proof of eligibility includes:

- Official military transcript (JST or CCAF)

Military Service Credits are irrevocable once awarded. Potential consequences should be identified and understood before a request is submitted. Students must consult their academic advisor for advice on the number of credits from military service that can be used in their degree program to avoid excessive credit accumulation and possible negative effects.
Extension and Correspondence Courses
Students may apply a maximum of 30 semester hours of approved extension class work and correspondence study toward a degree. Students may apply up to 12 hours of correspondence credit earned through an accredited institution toward the requirements for an undergraduate degree, even though Texas A&M does not offer courses by correspondence.

Correspondence courses taken through the Defense Activity for Nontraditional Education Support (DANTES) may be accepted and included in the 12 hours allowed.

In order for a student in residence at Texas A&M to receive credit for correspondence work toward a bachelor’s degree, he or she should:

- obtain advance written permission from the dean of his or her college;
- present appropriate evidence of having completed the course.

Data and Research Services is authorized to act as an agent to receive correspondence courses.

International Admissions

International Admission Criteria

Transcripts/Examination Results
Official academic records (transcripts, marksheets, diplomas, etc.) are required for all secondary and any university coursework completed. Records should include all courses taken in high school and every college or university the applicant has attended.

Official records require the original seal or original signature of the Registrar, Principal, Headmaster or Director of Student Records. Official records should be mailed from the school directly to Texas A&M University, Office of Admissions. Examination results should be sent directly from the examination agency. In addition to the original records in a language other than English, Texas A&M requires official translations in English. Translations sent directly from the institution attended or from a recognized translator will be accepted. Transcript evaluations from an evaluation service which is a member of the National Association of Credential Evaluation Services (http://www.naces.org/members.html) or from the International Education Credential Services (http://www.aacrao.org/aacrao-solutions/aacrao-international/home) provided by the American Association of the Collegiate Registrars and Admissions Officers are recommended and will be accepted. We recommend a document-by-document evaluation (with a GPA) for high school credentials and a course-by-course evaluation for college/university transcripts from non-U.S. institutions. For students enrolled in the United States, we will accept copies of official transcripts from other countries that are on file and verified by the U.S. institution. Unofficial photocopies, fax copies and notarized copies of records, examination results or translations will not be accepted. Uploaded transcripts and diplomas indicating graduation from secondary school (final high school transcripts) will not be accepted. These transcripts must be mailed.

Admission Criteria for International Applicants with U.S. Based Credentials
International applicants who are completing their education at an institution that is accredited by the U.S. will be reviewed in accordance with the guidelines determined for domestic admission. However, these applicants must still meet international deadlines and testing requirements. (See item 2 below.)

Admission Criteria for International Applicants with Foreign Credentials
International applicants who are completing their education at an institution that is not accredited by the U.S. will be reviewed based on the following criteria:

1. Academic Achievement
   - International applicants are expected to complete an educational program that will allow them to be considered for admission to a university in their home country. Examples include the completion of Grade 13, Form 6 or 3 A-level exams following the General Certificate of Secondary Education (GCSE). Predicted A-level exam results must be received by the application closing date.
   - Applicants must submit proof of high school graduation, typically a diploma, leaving certificate, or official examination results. Students that complete the West African Examinations Council (WAEC) exam must submit a WAEC scratch card by the application closing date.
   - Successful applicants will rank near the top of their country’s educational system (B average or better) and score well above average on national exams.
   - Secondary school courses: Appropriate college preparatory coursework is required.

2. Testing
   - SAT or ACT scores will be considered in the review criteria for international freshman applicants. Additional English testing may be required after admission and before enrollment. Applicants whose native language is not English are required to demonstrate English proficiency by meeting any one of the following requirements:
     - TOEFL scores of 550 paper-based test or 80 internet-based test (taken within two years of date of intended enrollment)
     - IELTS with a 6.0 overall band score (taken within two years of date of intended enrollment)
     - SAT Evidence Based Reading and Writing (EBRW) score of 560 or higher or SAT Critical Reading score of 500 or higher on test taken prior to March 2016
     - ACT English score of 21 or higher
     - Completed all four years of high school within the U.S.

3. Individual Achievement and Recognition
   - Leadership positions held
   - Honors/awards received
   - Major national, state or Texas A&M scholarships received

Additional Requirements for International Applicants After Admission
If admitted, international applicants must fulfill the following additional requirements before enrollment:

1. International Student Services Channel
   Visit Howdy and click on the Applicant tab. Go to the International Student Services Channel, and click on New Students. At the new international student homepage, follow the instructions. For more information, please visit the International Student Services website.

2. English Verification/Certification
Texas A&M requires international undergraduate students to demonstrate the ability to speak, write and understand the English language. Undergraduate students may meet this requirement in one of five ways:

a. official TOEFL score of 600 paper-based test or 100 internet-based test; or
b. official IELTS score of 7.0 overall band; or
c. SAT Evidence Based Reading and Writing (EBRW) score of 560 or higher or SAT Critical Reading score of 500 or higher on test taken prior to March 2016; or
d. transfer from an accredited U.S. institution of higher education with at least 30 semester credit hours including the equivalent to Texas A&M’s ENGL 103 or ENGL 104 with a grade of “C” or better; or
e. achieve English Language Proficiency Verification by taking the English Language Proficiency Examination (ELPE) prior to registration for the first semester at Texas A&M University. If remedial English classes are necessary, it will extend the time required to complete a degree.

Scholarship Information for International Students

There are a limited number of scholarships, fellowships, grants and loans available to international students, both in the admission process and throughout their enrollment. Some of these come from academic departments, particularly for graduate applicants, but there are also forms of financial aid available through International Student Services and Scholarships & Financial Aid. International applicants with financial need are encouraged to complete the International Student Financial Aid Application (ISFAA) (http://financialaid.tamu.edu/Forms-%281%29.aspx). This form must be resubmitted annually for continued consideration.

One special opportunity that a student may be eligible for upon admission to Texas A&M University is the Texas/Mexico Education Scholarship. Texas law allows a limited number of admitted applicants who are citizens of Mexico, and who can document financial need, to pay the same tuition as the residents of the State of Texas. For more information regarding how to apply for this scholarship, please refer to International Student Services (http://iss.tamu.edu) website.

For additional information regarding financial assistance and other scholarships available to International Students, please contact:

Scholarships & Financial Aid
Texas A&M University
P. O. Box 30016
College Station, TX 77842-3016
(979) 845-3236
financialaid@tamu.edu
http://financialaid.tamu.edu

For additional information, please contact:

International Student Services Office
Pavilion Room 110
Texas A&M University
1226 TAMU
College Station, TX 77843-1226
USA
(979) 845-1824
Fax (979) 862-4633
iss@tamu.edu
http://iss.tamu.edu

Other Admissions

Admission Criteria for Other Application Types

Readmission Criteria

Admission decisions for readmission are based on the following:

• GPA on Texas A&M coursework;
• GPA on coursework since leaving Texas A&M;
• desired major; and
• information presented in the application and essay/statement of purpose if provided.

If you were previously admitted but did not enroll and attend class through the official census date, you do not qualify as a readmit, and you must apply as either a freshman or transfer student.

If you were previously enrolled at Texas A&M but did not attend class through the official census date of the previous long semester, then you must apply for readmission.

Transcripts from institutions attended since the last enrollment at Texas A&M are required as follows:

<table>
<thead>
<tr>
<th>If Desired Readmission Term Is</th>
<th>Must Have Transcripts Through</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 Spring semester</td>
<td>2017 Summer session</td>
</tr>
<tr>
<td>2018 Summer semester</td>
<td>2017 Fall semester</td>
</tr>
<tr>
<td>2018 Fall semester</td>
<td>2018 Spring semester if applying after June 1</td>
</tr>
</tbody>
</table>

Post-baccalaureate Undergraduate Criteria

Admission is limited and is intended for applicants with a degree who wish to apply for further study at the undergraduate level to pursue a second bachelor’s degree.

Additional requirements to complete a post-baccalaureate application:

• an official transcript indicating the receipt of a recognized baccalaureate degree
• a statement explaining why enrollment at Texas A&M is necessary
• official transcripts from all colleges attended (official high school transcript not required)

Admission decisions for post-baccalaureate undergraduates consider:

• GPA on transferable college coursework
• completion of prerequisite coursework
information presented in the application

Priority is given to qualified applicants for their initial degree; therefore, post-baccalaureate undergraduate admission may be limited or may not be available. Mays Business School, the College of Liberal Arts, the School of Public Health, and the College of Veterinary Medicine do not currently consider applicants for post-baccalaureate study. See the Classification section of this catalog for the enrollment rights and privileges of this classification.

**Undergraduate Non-degree Criteria**

Admission is limited and is intended for applicants with a high school diploma (with the exception of High School Enrichment Program participants) or for degree applicants who do not intend to pursue a baccalaureate degree at Texas A&M. This includes:

- local residents or University employees taking courses on a part-time basis
- applicants completing established Texas A&M University requirements for teacher or other certification
- applicants completing a prescribed set of courses as preparation for application to graduate study or professional programs (i.e., medical school, veterinary school, law school or CPA exam)
- others as deemed appropriate by the Office of Admissions and the college or program of admission

Additional requirements to complete an undergraduate non-degree application:

- a statement explaining why enrollment at Texas A&M is desired
- an official college transcript showing the latest collegiate coursework attempted or a complete, official high school transcript if no college work has been attempted after high school graduation
- additional information presented in the application may be considered

Priority is given to qualified applicants for their initial bachelor’s degree; therefore, non-degree admission may be limited or not available. The College of Liberal Arts limits enrollment to summer only and the College of Veterinary Medicine and School of Public Health does not allow non-degree seeking admission. See the Classification section of this catalog for the enrollment rights and privileges of this classification.

**Transient Session Only Criteria**

Admission is considered for applicants who wish to attend one specific session only and who present appropriate credentials for the level of specified coursework and apply within the processing period for the specific session.

Additional requirements to complete transient session only application:

- a statement explaining why enrollment at Texas A&M is desired
- an official college transcript showing the latest collegiate coursework attempted or a complete, official high school transcript if no college work has been attempted after high school graduation

**High School Enrichment Program**

Texas A&M University is pleased to offer the High School Enrichment Program (HSEP) for qualified high school students in the Bryan/College Station area that will provide college credit and may also provide credit toward high school graduation. Admission for this program is on a space-available basis. The applicant pool is competitive, and admission into this program is not guaranteed.

This program provides a chance to further your knowledge in a subject you have completed in high school and earn valuable credit for graduation at both levels. For example, if you are interested in Physics and you have completed all of the classes your high school offers, you may qualify to continue to study Physics at the college level.

To be considered for this program, students must have completed all levels of related coursework offered at their high school. Each student is eligible to take 1 (one) course per fall or spring semester, and course registration will be completed by the Texas A&M advisor. No summer classes are offered at this time. Classes will be held on the Texas A&M campus, and students and their parents/guardians will be responsible for any transportation considerations.

Eligibility requirements:

- You must be a junior or senior in high school in the Bryan/College Station area.
- You must have a minimum new SAT score of 1270 or an ACT score of 27.

**Academic Fresh Start Policy**

Applicants for admission or readmission to Texas A&M may choose to have academic coursework that was completed at least 10 years prior to their term of application removed from consideration in the admission decision (Texas residents only). All other admission requirements apply. Should a Fresh Start applicant be admitted, he or she will forfeit all credit earned prior to 10 years from the term of admission. Academic Fresh Start cannot be requested after an applicant is admitted or enrolled. Academic Fresh Start must be requested as part of the application process.

Academic work done subsequent to ten years will be used in the evaluation of the applicant for admission. If a student does not have course work subsequent to ten years, he or she will be considered for admission based on the guidelines for new entering freshmen, which will require, among other things, an acceptable SAT or ACT score that has been completed within the past five years.

Admitted Fresh Start applicants have “Academic Fresh Start” indicated on their official Texas A&M transcript, are required to satisfy TSI/ THEA requirements, and will follow the academic requirements of the Undergraduate Catalog of record for the term of admission.

Forfeited coursework cannot be considered as prerequisites, but placement examinations are allowed for courses which were not considered for admission because of the Fresh Start Policy. Once admitted on Academic Fresh Start, the applicant or student cannot subsequently request that the Fresh Start policy restrictions be removed.

If an applicant has used the Academic Fresh Start Policy at a previous school, the Academic Fresh Start will remain in effect at Texas A&M upon transfer.

**Entry to a Major – College of Engineering**

Freshmen in General Engineering (https://engineering.tamu.edu/academics/advisors-procedures/entry-to-a-major/general-engineering-program), Engineering at Galveston (https://engineering.tamu.edu/academics/engineering-at-galveston), Engineering at McAllen (http://engineering.tamu.edu/academics/engineering-at-mcallen), or Engineering
Academy programs (https://engineering.tamu.edu/academies) have a common first year engineering curriculum to allow time for students to learn about the 18 engineering degree granting majors. It is recognized that in most cases students are not made aware of all of our engineering majors while in high school. Students are introduced to the different engineering majors in the first year engineering courses, ENGR 111 and ENGR 112. Students are encouraged to leverage additional resources, including the career center, faculty, as well as advisors to get career advice. Students must complete the following courses in at least two semesters before applying to an engineering major: two engineering courses, two math courses, and two science courses in the freshman year engineering curriculum. Exceptions will be made as needed for students entering with credit for the required courses. The entry-to-a-major process is designed for students to take ownership of their future to identify at least three majors that are a good match for their career goals and academic performance. The entry-to-a-major process is designed to place students in the highest rank major possible based upon capacity and student performance. Students are encouraged to be in a major as early as possible. Students in the General Engineering (https://engineering.tamu.edu/academics/advisors-procedures/entry-to-a-major/general-engineering-program), Engineering at Galveston (https://engineering.tamu.edu/academics/engineering-at-galveston), and Engineering at McAllen (http://engineering.tamu.edu/academics/engineering-at-mcallen) programs must be in a major by the end of the third semester in engineering. Students in the Engineering Academy programs (https://engineering.tamu.edu/academies) must be in a major by the end of the fourth semester in engineering.

Transfer students are admitted directly to a major degree granting program through the admissions process.

### Upper-Level Entry into Colleges of Architecture, Business and Veterinary Medicine and Biomedical Sciences—Biomedical Science

#### College of Architecture

**Transfer Students**

Transfer students, who meet the University entrance requirements and who desire to enter a major field of study in the College of Architecture, will be admitted based on available space and current College of Architecture entrance criteria. Following admission, all transfer students are placed on a 2.5 GPR probation for a minimum of 12 credit hours to substantiate competency in required lower-level courses. Transfer students will be admitted into the college with a lower-level classification and may apply for upper-level status after at least one semester at Texas A&M University.

#### Change of Major

Students currently enrolled in another major at Texas A&M University with fewer than 60 hours who desire to change their major field of study into the College of Architecture must fill out a Change of Curriculum application. Deadlines for applications are as follows:

- March 1 for summer admittance (for Construction Science, Environmental Design Architectural Studies, Landscape Architecture, Urban and Regional Planning and Visualization students)
- June 15 for fall admittance (for Construction Science, Environmental Design Architectural Studies, Landscape Architecture, Urban and Regional Planning and Visualization students)
- October 1 for spring admittance (for Construction Science, Landscape Architecture, Urban and Regional Planning and Visualization students)

Students will be notified of action on their applications within 30 days of the deadline date. The college will admit the best-qualified applicants based on the number of spaces available in their program of choice.

#### Mays Business School

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level. **NOTE:** To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

   d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level
requirements shall not be permitted to remain registered in upper-level business classes.

2. **Transfer students:** Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. **Change of curriculum students:** Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to the upper level may do so.

4. **Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School.** All ineligible students who preregister for upper-level business classes are subject to cancellation of their registration in these courses.

### College of Veterinary Medicine and Biomedical Sciences

#### Biomedical Sciences

1. A Biomedical Sciences (BIMS) major will be admitted into the upper-level courses according to the following criteria:
   a. Completion of a set of Common Body of Knowledge (CBK) courses with a grade of "C" or better in each course completed at Texas A&M. Any CBK course transferred from a community college must have a minimum grade of a "B". Normally, for admission to BIMS upper-level courses, a student may have attempted a CBK course no more than twice.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
<td></td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 238</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td></td>
<td><strong>35</strong></td>
</tr>
</tbody>
</table>

b. A minimum of 55 completed semester hours with a cumulative resident Grade Point Ratio (GPR) of 2.5 or better.

c. Process: Each student upon completing 55–65 semester credit hours must have a degree audit to verify upper-level eligibility.

2. The Biomedical Sciences Program will continue to accept changes of major into BIMS according to current Texas A&M University policy, but restrict changes of major into the upper-level courses (BIMS) according to the criteria listed in item 1. Students in other majors requesting a change of major to the BIMS program must also fulfill the criteria in item 1. In addition, the dean must verify availability of resources necessary to insure the student’s full-time enrollment in required upper-level courses prior to admission to upper-level status. If such courses are not available, the student will be denied admission to Biomedical Sciences.

3. To enter BIMS upper-level courses, transfer students must have:
   a. A minimum GPR of 3.0 in CBK courses with a grade of "B" or better in each completed course if taken at a 2-year college. A grade of "C" or better is accepted from a 4-year college.
   b. Transfer students admitted under another major and wishing to change into BIMS must complete one semester of graded coursework at Texas A&M University with a cumulative resident GPR of 2.5.
   c. Texas A&M University change of majors must have at least 55 semester credit hours with a minimum cumulative GPR of 2.5.

4. Students seeking readmission will be considered on a case-by-case basis, according to current catalog policy. No quotas will be placed on readmission; however, the decision to readmit will be dependent on resource availability and University policy.

5. Any BIMS student admitted to upper-level courses who then falls below the 2.5 GPR requirement will not be considered in good academic standing in their major and will be placed on college probation. Students who achieve less than a 1.0 GPR in any semester are not eligible for college probation or grade warning status. All Biomedical Sciences majors must follow established probation rules for the Biomedical Sciences Program.

6. The Dean, Director or Department Head will reserve the right to waive CBK or GPR requirements within the criteria established in Texas A&M University Student Rules.

7. No courses other than BIMS 481, BIMS 484, VIBS 310, VIBS 311, or research/directed studies courses can be taken S/U to be used in the degree plan.

8. BIMS probation is determined at the end of the Spring semester. Students not meeting acceptable GPR requirements (2.5 BIMS majors with 55 or more credit hours or 2.0 area of concentration (USVM) or BIMS majors with less than 55 credit hours) will be required to attend Texas A&M University that summer and repeat courses as needed to raise their GPR. Students who achieve less than a 1.0 GPR in any semester (BIMS or USVM) are not eligible for college probation or grade warning status.

9. Students may only attempt CVM courses a total of three times.

### Texas Success Initiative (TSI)

The Texas Success Initiative (TSI) was instituted to ensure that students enrolled in Texas public colleges and universities possess the necessary academic skills to perform effectively in college and to provide diagnostic information about reading, writing and mathematics skills of each student. All undergraduate students who did not meet one of the allowed exemptions must take the approved TSI Assessment test.

Students who do not meet established cutoff scores or other approved exemptions for the TSI Assessment test are required by Texas law to be...
enrolled in, and actively attend, an academic skills course and/or program each semester prior to completing all TSI requirements. Academic skills courses in each of the three TSI areas are offered by Texas A&M. Failure to meet the attendance requirements of the academic skills course will result in withdrawal from Texas A&M. The hours for these courses will not count toward any degree program but may count toward determining full-time status.

Students required to take the TSI Assessment test should have their scores sent by the testing agency to Texas A&M University.

More information can be obtained from testing centers at most Texas public colleges and universities or by contacting:

Texas Higher Education Coordinating Board
P. O. Box 12788
Austin, TX 78711-2788

or

Academic Success Center
10th Floor Rudder Tower
1133 TAMU
College Station, TX 77843-1133
(979) 845-2724

College of Dentistry – Caruth School of Dental Hygiene

Basis For Acceptance

All applicants will be considered using the following criteria. In addition, the applicant must be able to perform the essential functions required in the curriculum. The quality of the applicant’s academic achievement is a prime consideration. A grade point average (GPA) is computed based on all courses taken in college.

Preference for admission is given to students with:

- A cumulative GPA and Science GPA indicating ability to succeed in the program.
- Attention given to detail when completing the application.
- A comprehensive biographical sketch that includes information that will help the Admissions Committee know the applicant better. Details about the dental hygiene procedures that have been observed, a description of the community service projects in which you have participated and information concerning your interests, abilities and attitudes that have motivated you to make the commitment required for a career in dental hygiene are examples of information that might be included.

The application deadline is January 5. The Office of Recruitment and Admissions encourages applicants to submit the online application forms by December 1. All materials related to the application must be received in the Office of Recruitment and Admissions by February 1.

- The following must be included with the application when it is submitted online:
  a. Application for Admission
  b. Secondary Application
  c. List of courses in progress and those planned prior to enrollment in the dental hygiene program
  d. Biographical sketch
- Other materials that should be sent to complete your application:
  a. Application Fee ($35.00)
  b. Photograph sized 2 X 2 (does not have to be a passport picture - can be regular photograph cut down)
  c. Transcripts from high school and all colleges attended (if you attended a foreign high school, you do not have to submit a copy)
  d. Scores from Texas Success Initiative (TSI). (Or if exempt, SAT/ACT or TAAS – usually scores are listed on high school transcript; you do not have to submit scores separately.)
  e. Observation Verification Form (minimum 16 hours required)
  f. Evaluation Forms (submitted by a science instructor, dental hygienist and personal friend)

- An application is valid for one academic year only.
- Official transcripts are required and will be accepted only when sent directly from each school the applicant has attended.
- Recommendations are required from a dentist or a dental hygienist, a biology or chemistry instructor and an individual who has known the applicant for some time; for example, an employer or supervisor.
- It is the responsibility of the applicant to keep the application file current. Failure to supply grades, transcripts or recommendations may be perceived as an indication that the applicant is no longer interested in admission.

Interviews

Processing of applications begins the year prior to entrance into the professional program and continues until the class is filled. The applications are evaluated, and an invitation for an interview may be extended. The purpose of the interview is to determine the applicant’s knowledge of the dental hygiene profession. It also provides an opportunity for the applicant to see the facility, meet with the Admissions Committee and to ask questions about the Caruth School of Dental Hygiene program.

All prospective students are encouraged to contact the college with questions regarding prerequisite courses or the program.

To Access the Dental Hygiene Application Forms:

The applicant will need to create an account on the Banner Admissions Management Framework (BAMF) website. The applicant will be required to complete and submit the College of Dentistry Dental Hygiene Application, the Secondary Application and the Ethnicity Form.

The application for the Dental Hygiene Program will be available on the BAMF website from July 15 to January 5.

Download Forms (Adobe PDF files):

The Evaluation Form and Observation Verification Form are available for download. You will need to print these forms and submit them with signatures through regular mail.

- Evaluation Form – top section to be filled in by applicant
- Observation Verification Form

For questions about the application process, please contact The Office of Recruitment and Admissions at (214) 828-8231 or by email at admissions-dentistry@tamhsc.edu.

Mail forms and transcripts to:
Transfer Credit
Transfer credit will be determined by each component in conjunction with the staff of the college on a course-by-course basis from official transcripts submitted in the competitive admissions process. Course content will be determined by the catalog course description or course syllabus.

Course acceptability is guided by these criteria:

- Courses completed at regionally accredited institutions are considered for transfer if:
  a. They are acceptable as credit for a bachelor’s degree at a regionally accredited institution.
  b. Course content is at or above the level of courses specified in the requirements for admission.
- Courses intended for use in a vocational, technical or occupational program normally do not transfer; general courses within this type of program may transfer.
- Credit on the transcript must appear in semester hours or credits that may be converted to semester hours.
- Credit by examination courses may be transferred if accepted by another college and followed by sequenced coursework.
- Equivalency of coursework is determined by content found in catalog course descriptions or syllabi of courses. In case of doubt, departmental faculty will determine equivalency. The final determination is left to the director of the Department of Dental Hygiene.
- As a general policy, coursework with a passing grade may be transferred, but the applicant must keep in mind that admission to the hygiene program is on a competitive basis and grades of F are transferred, but the applicant must keep in mind that admission to the hygiene program is on a competitive basis and grades of F are calculated into the grade point average.
- Course hours will be evaluated on a course-by-course basis but will be transferred as a block of hours, and the grades do not calculate into the GPA for the hygiene program.
- Credit will be given for correspondence courses on a select basis.
- Typically, credit will not be given for courses completed at institutions not accredited by a regional accrediting agency.
- The college does not accept non-credit coursework to be used in lieu of coursework taken for academic credit.

College of Dentistry
Dental Hygiene Program (BS)

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Fee</td>
<td>$35 non-refundable fee</td>
</tr>
<tr>
<td>Admission Standards</td>
<td>Completion of required courses with GPA as high as possible. Admission is competitive.</td>
</tr>
<tr>
<td>Use of High School Record</td>
<td>No</td>
</tr>
<tr>
<td>Number of Articulation Agreements and Requirements for Admission</td>
<td>Not applicable</td>
</tr>
<tr>
<td>TOEFL**</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

College of Nursing (Health Science Center)

There are three different tracks leading to a baccalaureate degree in nursing. The traditional BSN track is for students seeking their first degree in college. The second degree BSN track (post baccalaureate) is for individuals who have already earned a bachelor’s degree in another field of study. The third option is an RN to BSN program for registered nurses who hold an associate degree in nursing. Prerequisite courses, which are the essential foundation for nursing, must be completed before entry into upper-division nursing courses through a competitive admission process. In addition, all students must meet the core curriculum requirements for Texas A&M University if not already completed at another institution.

The following documents are required for an application to be considered complete and ready for review:

- Application
- Application fee
- Official college transcript(s)
- Completion of prerequisite and core curriculum courses with a grade of C or better
- Personal essay (see website for specific information)
- Admissions Assessment Exam (HESI A2) required for traditional and second degree BSN applicants only
- Reference required for RN to BSN applicants only
- RN to BSN applicants must provide proof of State of Texas RN licensure in good standing
- Copy of permanent resident card, if applicable
- Official TOEFL Scores required for international applicants and must be taken within the past two years. Test scores must be sent directly from the testing agency to be considered official.

Applications must be received by the posted deadline. No late documents will be accepted. Admission to the college is competitive. At the time of application, students must be enrolled in or have completed all prerequisite course requirements. Admission offers may be made to students finalizing courses and will be contingent upon successful completion of all prerequisite requirements and students presenting a clear criminal background check.

Students applying to the College of Nursing must complete selected coursework as a condition of acceptance. If the student completed a core curriculum from another Texas public institution in a previous degree program, they are not required to complete the college’s Core Curriculum. Students transferring from out of state, from a private institution, those with an international degree or anyone with concerns about this requirement, please contact the Office of Student Affairs for further clarification. Students will not be considered for admission unless the required coursework will be completed by the time of enrollment.
Additional Requirements for International Applicants and Applicants with Foreign Credentials

In addition to each program's stated application requirements, applicants with foreign transcripts must also include an official World Education Services (WES) or Educational Credential Evaluations, Inc. (ECE) transcript evaluation report listing course-by-course U.S. grade point equivalencies and semester credits received. These reports must be sent directly from the evaluation agency in the original sealed envelope to NursingCAS. Send to: NursingCAS, P.O. Box 9201, Watertown, MA 02471. If sent via UPS or FEDEX, send to NursingCAS Transcript Department, 311 Arsenal Street, Suite #15, Watertown, MA 02472.

If admitted to the College of Nursing, applicants with foreign transcripts must submit the native language transcript along with an official English translation. These documents must include all original seals and/or signatures and be approved by the Texas A&M Office of Admissions prior to enrollment in the program.

Students may wish to speak with an advisor and provide results of the evaluation to determine transfer credits. Email CONadmissions@tamhsc.edu to request an appointment.

English Proficiency

Applicants whose native language is not English are required to submit proof of English proficiency by the application deadline, which is satisfied by:

- a minimum TOEFL score taken within the previous two years of:
  - 587 for paper-based testing (p-BT), or
  - 240 computer-based testing (c-BT), or
  - 95 Internet-based testing (i-BT), or
- a minimum IELTS score of 6.0 overall band
- completing all four years of high school in a U.S. accredited school, or
- earning a baccalaureate degree following four years of study at a U.S. accredited institution.

The College of Nursing requires scores that are higher than the minimum posted on the Texas A&M website due to the nature of the curriculum and expected student outcomes in order to verify English proficiency requirements. Test scores must be sent directly from the testing agency to be considered official. The institutional code for Texas A&M University for the TOEFL is 6003. There is no institutional code for the IELTS examination; therefore, please use the Office of Admissions address listed below when requesting your scores be sent to Texas A&M University. Tests should be taken at least eight weeks prior to the appropriate application deadline to ensure timely receipt and processing of results.

International Admissions Processing
Texas A&M University
P.O. Box 40002
College Station, TX 77842-4002

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>American History</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Government (Federal and Texas)</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

College of Nursing (Health Science Center) Traditional, Second Degree and RN to BSN

Course Credit

Course Credit Testing Services

Testing Services has primary responsibility for conducting research about students' learning and development at Texas A&M and for management of testing programs. The unit serves as the center for credit by examination, placement testing and correspondence testing, as well as national standardized testing. Other services include publication of research reports about student characteristics and abilities, test validation studies and evaluation studies, scanning and scoring services, and student ratings of faculty.

Credit by Examination

Undergraduate students at Texas A&M may earn course credits by demonstrating superior achievement on tests offered through several examination programs. Credit by examination is available to freshmen who plan to enter the University and to students who are currently enrolled. Credit earned by examination does not contribute to a student's grade point ratio. The University awards credit for scores on certain tests published by the Advanced Placement Program (AP), the College Level Examination Program Computer-Based Testing (CLEP CBT), the SAT Subject Tests, DANTES Subject Standardized Tests (DSST) and the International Baccalaureate (IB) Program. Texas A&M also offers...
qualified students opportunities to earn credits by taking departmental examinations prepared by the faculty. Information concerning credit by examination may be obtained from Testing Services (http://dars.tamu.edu) (979) 845-0532.

Please note these regulations concerning credit by examination:

1. Test scores and/or credit eligibility must be reported formally to Testing Services for credit by examination to be awarded. Credit is posted to the academic record once appropriate scores are received by Testing Services, the student has officially enrolled in the University and the student has accepted the credit. For information regarding current procedures for accepting credit, please visit the Testing Services website.

2. Students may not receive credit by examination for courses that are prerequisites to courses for which they already have credit except with the approval of the department authorizing the examination.

3. A student may not have credit posted for credit by examination for a course in which he or she is currently registered. If a student has acquired a grade or exercised First-Year Grade Exclusion on a course, then the student will not be eligible to take the equivalent departmental exam. Eligibility will not be affected if a student has a Q, W or NG in a course.

4. Please note that once any credit has been accepted it cannot be removed.

Advanced Placement Program (AP)

Examinations offered by the AP Program are administered during late spring by high schools. Students usually take the examinations after completing Advanced Placement courses, although experience in an AP course is not required. Interested students should contact their high school counselors for information concerning registration and test sites. High school students and currently enrolled students should have the College Board forward their scores to Testing Services, institution code: 6003. Advanced Placement scores of entering freshmen are generally received in July. Students will need to log onto their Howdy portal under My Records and then Credit by Exam to accept the credit earned via AP tests. Testing Services suggests visiting with your advisor before you accept credit.

The following list includes all AP examinations currently accepted for credit.

<table>
<thead>
<tr>
<th>AP Examination</th>
<th>Minimum Score Required</th>
<th>Texas A&amp;M Course(s)</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>3</td>
<td>CHEM 101, CHEM 111</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>CHEM 101, CHEM 102, CHEM 111, CHEM 112</td>
<td>8</td>
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<tr>
<td>Chinese</td>
<td>3</td>
<td>CHIN 101, CHIN 102</td>
<td>8</td>
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<tr>
<td></td>
<td>4</td>
<td>CHIN 101, CHIN 102, CHIN 201, CHIN 202</td>
<td>14</td>
</tr>
<tr>
<td>Comparative Governments</td>
<td>3</td>
<td>POLS 229</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science A</td>
<td>3</td>
<td>CSCE 110</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science Principles</td>
<td></td>
<td>CSCE 110</td>
<td>4</td>
</tr>
<tr>
<td>Economics: Macroeconomics</td>
<td></td>
<td>ECON 203</td>
<td>3</td>
</tr>
<tr>
<td>Economics: Microeconomics</td>
<td></td>
<td>ECON 202</td>
<td>3</td>
</tr>
<tr>
<td>English Lang. and Comp.</td>
<td>3</td>
<td>ENGL 104</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>ENGL 104, ENGL 241</td>
<td>6</td>
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<tr>
<td>English Lit. and Comp.</td>
<td>3</td>
<td>ENGL 104</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>ENGL 104, ENGL 203</td>
<td>6</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>3</td>
<td>GEOS 105</td>
<td>3</td>
</tr>
<tr>
<td>European History</td>
<td>3</td>
<td>HIST 102</td>
<td>3</td>
</tr>
<tr>
<td>French Language</td>
<td>3</td>
<td>FREN 101, FREN 102</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>FREN 101, FREN 102, FREN 201, FREN 202</td>
<td>14</td>
</tr>
<tr>
<td>German Language</td>
<td>3</td>
<td>GERM 101, GERM 102</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>GERM 101, GERM 102, GERM 201, GERM 202</td>
<td>14</td>
</tr>
<tr>
<td>Human Geography</td>
<td>3</td>
<td>GEOG 201</td>
<td>3</td>
</tr>
<tr>
<td>Italian Language</td>
<td>3</td>
<td>ITAL 101, ITAL 102</td>
<td>8</td>
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<tr>
<td></td>
<td>4</td>
<td>ITAL 101, ITAL 102, ITAL 201, ITAL 202</td>
<td>14</td>
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<tr>
<td>Japanese Language</td>
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<td>JAPN 101, JAPN 102</td>
<td>8</td>
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<tr>
<td>4</td>
<td>JAPN 101, JAPN 102, JAPN 201, JAPN 202</td>
<td>14</td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td>CLAS 121, CLAS 122</td>
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<tr>
<td>4</td>
<td>CLAS 121, CLAS 122, CLAS 221, CLAS 222</td>
<td>14</td>
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<tr>
<td>3</td>
<td>CLAS 121, CLAS 122, CLAS 221, CLAS 222</td>
<td>14</td>
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<tr>
<td>3</td>
<td>MUSC 102</td>
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<tr>
<td>3</td>
<td>PHYS 205</td>
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<tr>
<td>4</td>
<td>PHYS 201</td>
<td>4</td>
<td></td>
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<tr>
<td>3</td>
<td>PHYS 205</td>
<td>4</td>
<td></td>
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<tr>
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<td>PHYS 202</td>
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<td>PHYS 218</td>
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<td>3</td>
<td>PHYS 208</td>
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<tr>
<td>3</td>
<td>PSYC 107</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>SPAN 101, SPAN 102</td>
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<td>4</td>
<td>SPAN 101, SPAN 102, SPAN 201</td>
<td>11</td>
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<td>5</td>
<td>SPAN 101, SPAN 102, SPAN 201, SPAN 202</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SPAN 202</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>SPAN 202, SPAN 320</td>
<td>6</td>
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<tr>
<td>3</td>
<td>STAT 301, STAT 302 or STAT 303</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>ARTS 103</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ARTS 103,111</td>
<td>6</td>
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<tr>
<td>3</td>
<td>ARTS 103</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ARTS 103,111</td>
<td>6</td>
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<tr>
<td>3</td>
<td>ARTS 103</td>
<td>3</td>
<td></td>
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<tr>
<td>3</td>
<td>POLS 206</td>
<td>3</td>
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<tr>
<td>3</td>
<td>HIST 105, HIST 106</td>
<td>6</td>
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</tr>
<tr>
<td>3</td>
<td>HIST 104</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

1. Students must consult their academic advisor for advice on the number of credits that can be used in their degree program to avoid excessive credit accumulation and possible negative effects.

<table>
<thead>
<tr>
<th>Minimum Score Required</th>
<th>Texas A&amp;M Course(s)</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>MATH 102</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>POLS 206</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>MATH 151 or MATH 171</td>
<td>4</td>
</tr>
<tr>
<td>50</td>
<td>CHEM 101/ CHEM 111</td>
<td>4</td>
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<tr>
<td>50</td>
<td>CHEM 101/ CHEM 102</td>
<td>8</td>
</tr>
<tr>
<td>50</td>
<td>ACCT 209</td>
<td>3</td>
</tr>
<tr>
<td>60</td>
<td>HIST 105</td>
<td>3</td>
</tr>
<tr>
<td>60</td>
<td>HIST 106</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>EPSY 320 or PSYC 307</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>ECON 203</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>ECON 202</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>MATH 150</td>
<td>4</td>
</tr>
<tr>
<td>50</td>
<td>PSYC 107</td>
<td>3</td>
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<tr>
<td>50</td>
<td>SOCI 205</td>
<td>3</td>
</tr>
<tr>
<td>60</td>
<td>HIST 101</td>
<td>3</td>
</tr>
</tbody>
</table>

2. Variable credits up to a maximum of 3 credit hours. Students must consult their academic advisor for advice on the number of credits that can be used in their degree program to avoid excessive credit accumulation and possible negative effects.

For instructions on accepting AP credit, please visit our website (http://dars.tamu.edu).

**College Level Examination Program Computer-Based Testing (CLEP CBT)**

CLEP CBT tests are designed to evaluate nontraditional college-level education such as independent study, correspondence work, etc. Both enrolled undergraduate students and entering freshmen may receive CLEP CBT credit for the courses which are listed below. Only examination titles below are currently accepted. The minimum scores listed below are based on the current version of CLEP CBT Examinations. Students will need to log onto their Howdy portal under My Records and then Credit by Exam to accept the credit earned via CLEP tests. Testing Services suggests visiting with your advisor before you accept credit.

<table>
<thead>
<tr>
<th>CLEP CBT Subject Examination</th>
<th>Minimum Score Required</th>
<th>Texas A&amp;M Course(s)</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algebra</td>
<td>50</td>
<td>MATH 102</td>
<td>3</td>
</tr>
<tr>
<td>American Government</td>
<td>50</td>
<td>POLS 206</td>
<td>3</td>
</tr>
<tr>
<td>Calculus with Elementary Functions</td>
<td>50</td>
<td>MATH 151 or MATH 171</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry</td>
<td>45</td>
<td>CHEM 101/ CHEM 111</td>
<td>4</td>
</tr>
<tr>
<td>Spanish Literature</td>
<td>50</td>
<td>CHEM 101/ CHEM 102</td>
<td>8</td>
</tr>
<tr>
<td>Statistics</td>
<td>50</td>
<td>ACCT 209</td>
<td>3</td>
</tr>
<tr>
<td>History of the United States I: Early Colonization to 1877</td>
<td>60</td>
<td>HIST 105</td>
<td>3</td>
</tr>
<tr>
<td>History of the United States II: 1865 to the Present</td>
<td>60</td>
<td>HIST 106</td>
<td>3</td>
</tr>
<tr>
<td>Human Growth and Development</td>
<td>50</td>
<td>EPSY 320 or PSYC 307</td>
<td>3</td>
</tr>
<tr>
<td>Macroeconomics</td>
<td>50</td>
<td>ECON 203</td>
<td>3</td>
</tr>
<tr>
<td>Microeconomics</td>
<td>50</td>
<td>ECON 202</td>
<td>3</td>
</tr>
<tr>
<td>Pre-Calculus</td>
<td>50</td>
<td>MATH 150</td>
<td>4</td>
</tr>
<tr>
<td>Psychology, Introductory</td>
<td>50</td>
<td>PSYC 107</td>
<td>3</td>
</tr>
<tr>
<td>Sociology, Introductory</td>
<td>50</td>
<td>SOCI 205</td>
<td>3</td>
</tr>
<tr>
<td>Western Civilization I: Ancient Near East to 1648</td>
<td>60</td>
<td>HIST 101</td>
<td>3</td>
</tr>
</tbody>
</table>
Western Civilization II: 1648 to Present

For instructions on accepting CLEP credit, please visit the Testing Services website (http://dars.tamu.edu).

Dantes Subject Standardized Tests (DSST) Program

The DSST Program is available to all interested persons. Enrolled undergraduate students and entering freshmen may receive DSST credit for the courses listed below. For more information about the test, please contact Testing Services.

<table>
<thead>
<tr>
<th>DSST Examination</th>
<th>Minimum Score Required</th>
<th>Texas A&amp;M Course(s)</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art of the Western World</td>
<td>50</td>
<td>ARTS 149, ARTS 150</td>
<td>6</td>
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International Baccalaureate (IB)

Texas A&M University, in compliance with SB111, will grant at least 24 semester credit hours of course-specific college credit in subject-appropriate areas on all International Baccalaureate (IB) exam scores of 4 or above as long as the incoming freshman has earned an IB diploma. While some course credit will be awarded regardless of a student’s IB diploma status, some course credit at Texas A&M University may be subject to the successful completion of the IB diploma.

Entering freshman students should submit their International Baccalaureate transcript to Texas A&M University, institution code: 01355, for review. Students should contact Testing Services regarding their eligibility for course credit. Students should work with an academic advisor to determine the use of the IB credits in their individual degree plan and the impact accepting the credit may have upon tuition rebate eligibility, tuition charges for excessive total hours, and preparedness for sequential coursework based on IB test scores. Students will need to log onto their Howdy portal under My Records and then Credit by Exam to accept the credit earned via IB tests. Testing Services suggests visiting with your advisor before you accept credit.

Texas A&M University will notify IB applicants of their eligibility to receive credit by posting information on the website, Testing Services, and by establishing links to other web pages.

The evaluation of IB courses in order to identify the appropriate course credit is continuing and will be posted as it becomes available. The following list includes all IB examinations currently accepted for credit.

<table>
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<th>Texas A&amp;M Course(s)</th>
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Texas A&M University Undergraduate Catalog

Subject Test | Minimum Score Required | Credit Hours | Texas A&M Course(s)
--- | --- | --- | ---
Chemistry | 630 | 4 | CHEM 101/ CHEM 111
French | 640 | 4 | FREN 101
| 740 | 8 | FREN 101, FREN 102
German | 630 | 4 | GERM 101
| 740 | 8 | GERM 101, GERM 102
Italian | 630 | 4 | ITAL 101
| 750 | 8 | ITAL 101, ITAL 102
Latin | 630 | 4 | CLAS 121
| 730 | 8 | CLAS 121, CLAS 122
Physics | 680 | 8 | PHYS 201, PHYS 202
Spanish | 630 | 4 | SPAN 101

The minimum score required is based on the recentered scale. Students who took tests before April 1, 1995, should contact Testing Services to determine the minimum score required. For instructions on accepting SAT Subject credit, please visit our website (http://dars.tamu.edu).

Departmental Examinations for Entering Freshmen and Currently Enrolled Students

Qualified entering freshmen may take departmental tests after being officially admitted into Texas A&M University. Currently enrolled students can also take the exams throughout the year. Contact Testing Services (http://dars.tamu.edu) for registration information. The tests are prepared by participating Texas A&M departments. Current offerings include:

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<th>Code</th>
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<td>CSCE 110</td>
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<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
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<tr>
<td>MATH 102</td>
<td>Algebra (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
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<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus (Available to entering freshman only during the summer before beginning classes at Texas A&amp;M)</td>
<td>4</td>
</tr>
</tbody>
</table>

For instructions on accepting IB credit, please visit our website (http://dars.tamu.edu).
Galveston campus or For further information, see the section on Texas A&M University merchant marine officer. Four undergraduate programs. These programs lead to licensing as a University Galveston campus offers a training program concurrently with Texas A&M Maritime Academy at Texas A&M Test (Code 6592) should be sent directly to Texas A&M University may be obtained from the Office of Student Relations in Galveston. Admission information for Texas A&M University Galveston campus the online catalog for the Texas A&M University Galveston campus. Please reference the Texas A&M University Graduate and Professional Catalog on this website.

Graduate Admission
Graduate Admission
For information or applications for graduate admission, please contact:
Office of Graduate Admissions
Texas A&M University
P. O. Box 40001
College Station, TX 77842-4001
(979) 845-1060
graduate-admission@tamu.edu
http://admissions.tamu.edu/graduate

Galveston
Texas A&M University Galveston Campus
Texas A&M University Galveston campus offers ocean oriented undergraduate and graduate curricula leading to Texas A&M University degrees in Maritime Studies, Marine Biology, Marine Engineering Technology, Marine Fisheries, Marine Sciences, Marine Transportation, Maritime Administration, Ocean and Coastal Resources and University Studies (with concentrations in Oceans and One Health, Marine Environmental Law and Policy, Maritime Public Policy and Communication, and Tourism and Coastal Community Development). Graduate curricula are offered in Marine Resource Management (master’s level), Marine Biology (master’s and doctoral levels) and Maritime Administration and Logistics (master’s level). Applicants who wish to enroll must meet all requirements for admission as specified in the online catalog for the Texas A&M University Galveston campus. Admission information for Texas A&M University Galveston campus may be obtained from the Office of Student Relations in Galveston. Results of the Scholastic Aptitude Test (Code 6835) or American College Test (Code 6592) should be sent directly to Texas A&M University Galveston campus. The Texas A&M Maritime Academy at Texas A&M University Galveston campus offers training program concurrently with four undergraduate programs. These programs lead to licensing as a merchant marine officer.

For further information, see the section on Texas A&M University Galveston campus or www.tamug.edu.

Registration and Academic Status
Registration and Academic Status
Registration for the fall and spring semesters is accomplished at several times. During the fall and spring semesters (in November and April), a preregistration period is held for currently enrolled and reenrolled students to register for the next semester. There are periods of announced open registration for students who were unable to preregister during the scheduled preregistration period. New Student Conferences serve as an opportunity for new undergraduate students to register. Further information concerning registration may be obtained from the academic calendar published in this catalog or from the Office of the Registrar. The schedule of classes is available online.

Full-Time Student
A full-time undergraduate student is defined as one who is registered for 12 semester hours during a fall or spring semester or 8 hours in a summer term. Full-time enrollment for federal financial aid is always defined as 12 semester hours, including the summer term. A Q grade or W grade does not count toward the certification of enrollment status. Only hours for which a student is currently enrolled at Texas A&M University can be used toward certification of enrollment.*

* - Students participating in the Blinn TEAM program or the TAMU Engineering Academy at Blinn Bryan program may observe unique enrollment certification specifications based on the program agreements. Enrollment status for students in these programs is reported to the National Student Clearinghouse by Texas A&M University and includes enrolled hours from both institutions. Students can obtain enrollment verification which will reflect this enrollment status from the National Student Clearinghouse through Howdy. Students alternatively requesting enrollment verification directly from the Texas A&M University Registrar’s Office on TAMU letterhead are provided enrollment verification of Texas A&M University enrolled hours ONLY. Students may also consider obtaining a verification of their enrollment from Blinn College that will reflect their Blinn enrollment.

Undergraduates Registering for Graduate Courses
A senior undergraduate student with a cumulative grade point average of at least 3.0 or approval of his/her academic dean, is eligible to enroll in a graduate course and reserve it for graduate credit by filing a petition obtained from the student’s undergraduate college and approved by the course instructor, the student’s major department head, the dean of the college offering the course, and the dean of the student’s undergraduate college.

An academically superior undergraduate student with a cumulative grade point average of at least 3.25 or approval of his/her academic dean, is eligible to apply graduate credit hours toward his/her undergraduate degree program by filing a petition obtained from the student’s undergraduate college and approved by the course instructor, the student’s major department head, the dean of the college offering the course, and the dean of the student’s undergraduate college. Graduate
credit hours used to meet the requirements for a baccalaureate degree may not be used to meet the requirements for a graduate degree.

**VA Benefits**

Students who are military veterans should note that to receive full VA benefits they must be registered for enough hours to be considered full-time for their degree during each term they are seeking benefits. This number may differ between degrees and during the summer semester. For hour requirements, please visit Veterans Services.

**Maximum Schedule**

An undergraduate student with an overall grade point average of 3.0 or better may register for a course load in excess of 19 hours in a fall or spring semester with the approval of his or her advisor. An undergraduate student with an overall grade point average of less than 3.0 must obtain approval of his or her dean before registering for a course load in excess of 19 hours in a fall or spring semester.

**Classification**

Each student has a classification which indicates the type of degree program in which the student is enrolled, and reflects the student’s progress within that program. The classifications are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Classification Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>U0</td>
<td>Undergraduate Non-degree</td>
</tr>
<tr>
<td>U1</td>
<td>Freshman 0-29 hours</td>
</tr>
<tr>
<td>U2</td>
<td>Sophomore 30-59 hours</td>
</tr>
<tr>
<td>U3</td>
<td>Junior 60-89 hours</td>
</tr>
<tr>
<td>U4</td>
<td>Senior 90+ hours</td>
</tr>
<tr>
<td>U5</td>
<td>Postbaccalaureate Undergraduate</td>
</tr>
</tbody>
</table>

Undergraduate non-degree students are subject to TSI and English proficiency requirements. With few exceptions, undergraduate non-degree status is not available to international students.

Undergraduate non-degree students are not permitted to enroll in courses until all degree seeking students have had the opportunity to enroll. Undergraduate non-degree enrollment begins on the first day of open registration. Enrollment may be limited by college or program policies. Admitted students are not eligible for refund of the admission processing fee regardless of course availability.

An undergraduate non-degree student must maintain a 2.0 GPA on all coursework attempted to remain eligible to register. Enrollment is subject to review at the end of each semester of enrollment. Enrollment beyond two years of attendance will be approved only in exceptional cases.

An undergraduate non-degree student may not take graduate-level coursework.

Undergraduate non-degree students are subject to TSI and English proficiency requirements. An undergraduate non-degree student does not qualify for financial aid through the University.

With few exceptions, undergraduate non-degree status is not available to international students.

Students with a recognized baccalaureate degree who wish to complete requirements for a second baccalaureate degree at Texas A&M University or to complete established Texas A&M University certification requirements.

The postbaccalaureate undergraduate classification (U5) has all the privileges and responsibilities of a senior classification (U4).

Recipients of a Texas A&M University baccalaureate degree are not eligible for continued enrollment unless they have the specific approval of the college offering the second bachelor’s degree or certification. Should they break enrollment, they must apply for readmission as second bachelor’s degree candidates.
A candidate for a second baccalaureate degree must complete all the essential work of the second degree not covered in the first. In all such cases, the total semester hours required must be at least 30 semester hours additional to the greater number required for either degree (see Two Degrees in the Degree Information section). To pursue a second baccalaureate degree concurrently with the pursuit of the initial degree, all essential work required for a second degree must be defined in advance in writing by the dean of the college granting the second degree. To pursue a second baccalaureate degree sequentially requires admission to a second bachelor’s degree classification. Pursuit of a second baccalaureate degree may be limited or may not be allowed by some colleges.

### Academic Status

#### Distinguished Student and Dean’s Honor Roll

An undergraduate student who completes a semester schedule of at least 15 graded hours or a summer session schedule of at least 12 graded hours with no grade lower than C and with a grade point average of not less than 3.5 for the semester or for a summer session shall be designated “distinguished student.” A student who, under the same circumstances, achieves a grade point average of at least 3.75 shall also be designated as a member of the “dean’s honor roll.” First semester freshmen must complete a semester schedule of at least 15 hours with no grade lower than a C, no Q-drops and with a grade point average of not less than 3.5 for “distinguished student” designation and a 3.75 for “dean’s honor roll.” Official notification of these designations will be issued to the student by the dean of the student’s college. The hours earned with a grade of S shall not be included in determining minimum hours required for the designation of “distinguished student” or “dean’s honor roll.” A grade of I or U disqualifies a student from being considered as a “distinguished student” or for the “dean’s honor roll.” Grades of Q, W, and NG may not be included in the 15 graded hours. Only undergraduate courses or graduate courses used for the undergraduate degree will be used in either calculation.

#### Scholastic Probation

Scholastic probation is conditional permission for an undergraduate student to continue in the University after he or she has become scholastically deficient. For university policy regarding scholastic deficiency and scholastic probation, see the Texas A&M University Student Rules (http://student-rules.tamu.edu).

### Withdrawal from the University

An official withdrawal from the university will result when a student drops all in progress and courses not yet started in a particular term. A student who withdraws from the university before the completion of a semester or summer term is required to comply with the official withdrawal procedure. This process is initiated by submitting a request through the Student Withdrawal channel on the My Record tab in the Howdy portal. Students may not withdraw after the Q-drop deadline. The student’s dean will retain the authority to support a student withdrawal after the deadline.

If a student is enrolled in one or more inter/intra-session ("minimesters") or summer terms and chooses to withdraw, all current and future in progress courses for the entire semester will be dropped. The student will be ineligible to register for courses for the remainder of that semester.

For university policy regarding withdrawal, see the Texas A&M University Student Rules (http://student-rules.tamu.edu).

### Correct Addresses

It is necessary to have a correct residence address on file with the University. Students may change their address in Howdy. International students must have a correct physical and permanent address. International students must go to International Student Services to change their physical and permanent addresses.

Texas A&M may also use email for official communications. It is each student’s responsibility to claim his/her Texas A&M University email account (http://gateway.tamu.edu) and to check that account on a frequent and consistent basis.

### Grading System

Because students attend a college or university to extend their education, grades are usually given as an indication of the proficiency of their endeavors. The student’s semester grade in a course shall be based upon performance and/or participation in class, exercises and tests, laboratory work and final examination as applicable to the course. The proportionate weight assigned to each of the factors shall be determined by the department administering the course.

The basis upon which the final grade will be determined shall be distributed in written form to the class during the first class meeting.

There are five passing grades at the undergraduate level, A, B, C, D and S, representing varying degrees of achievement; these letters carry grade points and significance as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent, 4 grade points per semester hour</td>
</tr>
<tr>
<td>B</td>
<td>Good, 3 grade points per semester hour</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory, 2 grade points per semester hour</td>
</tr>
<tr>
<td>D</td>
<td>Passing, 1 grade point per semester hour</td>
</tr>
<tr>
<td>F</td>
<td>Failing, no grade points, hours included in GPA calculation</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete, no grade points, hours not included in GPA calculation</td>
</tr>
</tbody>
</table>
Repertion of a Course to Improve Grade

Any undergraduate student who wishes to repeat a course must do so before he or she completes a more advanced course in the same subject. What constitutes a more advanced course will be determined by the head of the department offering the course.

Credit for a course failed may be obtained only by registering for and repeating the course. The original grade will remain on the student's permanent record, and both grades will be used in computing the GPA. An F or U previously earned is not removed once the course is passed. Credit for each repeated course may only be used once toward degree requirements.

A student repeating a course completed at Texas A&M University in which a grade of B or better has been earned will not receive grade points for the repeated course, unless the catalog states the course may be repeated for credit.

I and X Grades

A temporary grade of I (incomplete) at the end of a semester or summer term indicates that the student has completed the course with the exception of a major quiz, final examination or other work. The instructor shall give this grade only when the deficiency is due to an authorized absence or other cause beyond the control of the student. When an instructor reports an incomplete grade to the Office of the Registrar, he or she will fill out an "Incomplete Grade Report," which is filed with the head of the department in which the course is taught. Copies are sent to the student and to the student’s academic dean. This report includes:

1. a statement of the instructor’s reason for awarding the incomplete grade and
2. a statement concerning the remaining work to be completed.

The remaining work must be completed before the last day of scheduled classes of the next fall or spring semester in which the student enrolls in the University unless the student’s academic dean, with the consent of the instructor (in the absence of the instructor, the department head), grants an extension of time for good reason. If the incomplete work is not completed within this time or if the student registers for the same course again, the I will be changed to an F by the Office of the Registrar.

The X notation is assigned to a course by the Office of the Registrar at the end of a semester or summer term only when a grade is not submitted by the instructor. The X notation is assigned when an X notation has been made. The dean of the college offering the course will request, through the department head, that the instructor submit a Grade Change Request online in Howdy, removing the X notation and assigning a grade. The instructor will have 30 days from the beginning of the succeeding semester or summer term to report a change of grade to the Office of the Registrar. If a Grade Change Request is not received during this time period, the Office of the Registrar will automatically remove the X notation and assign a grade of F.

Q-Drop and Add and Drop

1. A student may enroll in a class during the first five class days of a fall or spring semester or during the first four class days of a summer term. A student requesting to add a course after these deadlines must have the approval of the student’s dean or designee and department.
2. A student may drop a course with no record during the first 12 class days of a fall or spring semester and during the first four class days of a summer term. Following this period, if approved by the dean of the college or his or her designee, a student may drop a course without penalty through the 60th class day of a fall or spring semester, the 15th class day of a summer term or the 35th class day of a 10-week summer semester. The symbol Q shall be given to indicate a drop without penalty.

Under section 51.907 of the Texas Education Code, “an institution of higher education may not permit a student to drop more than six courses, including any course a transfer student has dropped at another institution of higher education.” Any course that a student drops is counted toward the six-course limit if “(1) the student was able to drop the course without receiving a grade or incurring an academic penalty; (2) the student’s transcript indicates or will indicate that the student was enrolled in the course; and (3) the student is not dropping the course in order to withdraw from the institution.” Some exemptions for good cause could allow a student to drop a course without having it counted toward this limit, but it is the responsibility of the student to establish that good cause.

Undergraduate students at Texas A&M University will normally be permitted four Q-drops during their undergraduate studies. However, in order to comply with this statute a student who has dropped courses at other Texas public institutions may not be permitted four Q-drops if the student’s total number of dropped courses would exceed the State limit of six.

3. Any course taught on a shortened format or between regularly scheduled terms will have add/drop, Q-drop and withdrawal dates proportionally the same as if the course were offered in a regular term. These dates will be determined by the Office of the Registrar.

4. After the Q-drop period has elapsed, a course may be dropped and a grade of W recorded if the student’s dean determines that unusual circumstances exist to warrant a late drop.
Satisfactory/Unsatisfactory

Undergraduate students may be permitted to take courses in their degree programs at Texas A&M University on a satisfactory/unsatisfactory (S/U) basis consistent with the requirements of the student’s college. The hours for which a student receives a grade of satisfactory shall not be included in the computation of the student’s semester or cumulative GPA; a grade of unsatisfactory shall be included in the computation of the student’s grade points per credit hour as an F. A grade of satisfactory (S) will be given only for grades of C and above; a grade of unsatisfactory (U) will be given for grades D and F. The hours earned on a satisfactory/unsatisfactory basis shall not be included in the designation of distinguished student or dean’s honor roll.

Students on probationary standing may be required to take electives on an S/U basis as determined by published college policies.

Students must register for courses on an S/U basis during the official registration periods and shall not be permitted to change the basis on which their grades will be recorded on their official transcripts, except for unusual circumstances and with the approval of the student’s academic dean.

Students registered for KINE 198 or KINE 199 who wish to change the grade type from a graded course to S/U or from S/U to a graded course, may do so in Howdy. All requests for KINE 198 and KINE 199 changes must be completed on or before the Q-drop deadline for the fall, spring or summer semester.

Semester Credit Hour

A lecture course which meets one hour per week for 15 weeks is worth 1 semester credit hour. Thus, a course worth 3 semester credit hours, meets three hours per week. Credit hours for laboratory courses are determined to be some fraction of the number of hours spent in class.

The Texas Higher Education Coordinating Board defines minimum course lengths as part of the Texas Administrative Code, “Minimum Length of Courses and Limitation on the Amount of Credit that a Student May Earn in a Given Time Period”. For more information, please see the Texas Administrative Code online (http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=T&app=9&p_dir=N&p_rloc=162966&p_tloc=&p_ploc=1&pg=2&p_tac=&ti=19&pt=1&ch=4&ft=5)

Grade Point Average (GPA)

Only the grade earned in coursework for which the student was registered in this institution shall be used in determining his or her grade point average. Students anticipating graduating with honors should refer to that section of this catalog for information concerning the computation of grade point averages for that purpose.

A student’s grade point average for any period shall be computed by dividing the total number of semester hours for which he or she received grades into the total number of grade points earned in that period. Semester credit hours to which grades of F or U are assigned shall be included; those involving grades of W, Q, S, X, I, and NG shall be excluded.

Classification

Classification for academic purposes shall be based solely on scholastic progress as shown by the official records in the Office of the Registrar. Sophomore, junior and senior classification will be granted students who have passed 30, 60 and 90 semester hours, respectively.

Grade Reports

Mid-semester Report

Near the middle of the fall and spring semesters, a preliminary report, showing the current progress of undergraduate students who have completed less than 30 semester credit hours of coursework at Texas A&M, and of a selected group of other students that the academic deans/departments are monitoring, will be made available. Preliminary grades are not recorded on the student’s permanent record. Grades are available in Howdy.

Final Grade Report

End of semester final grades are available in Howdy. No student grade may be posted in a manner that is personally identifiable unless the student has given written consent in advance.

Parent/Guardian Access to Grades

A parent or guardian may access midterm and final grades in Howdy after the student sets the parent access password. The Office of the Registrar cannot access the passwords created by students for parental access.

Transcripts

Students applying for admission to Texas A&M are required to submit transcripts of previous academic work and in some cases, results of standardized tests. The submission of altered documents or the failure to furnish complete and accurate information on admission forms will be grounds for disciplinary action.

Individuals who have attended the University may obtain an official transcript of their completed work, provided they have no financial obligations to the University. A fee, which, according to state law must be paid in advance, will be charged for each copy. During grading and degree posting, official transcripts may be produced for enrolled students only if all courses for that semester or term are shown as in progress (IP) or have all final grades posted. Students and former students may submit a Transcript Request Order form in person, by mail, by fax or by completing the transcript request form in the Howdy portal. Transcript requests will not be accepted over the phone. A faxed request must be paid using a credit card from a United States bank. A transcript request ordered through the Howdy portal must be paid either by electronic check (ECH) or by credit card from a United States bank. Requests made in person or by mail may only be paid with check, money order or a credit card.

Housing

Off-Campus Student Services
http://ocss.tamu.edu

AggieSearch provides students access to apartment and property listings, as well as roommate search options.

The Off Campus Survival Manual (OCSM) introduces students to the community and provides information regarding leases, transportation, security deposits, the BCS community, and more.

On-Campus Housing and White Creek Apartments
http://reslife.tamu.edu
Academic integrity requires a commitment by all faculty, students, and the exception of the Corps of Cadets, students are not required to live on campus at Texas A&M.

University Apartments (The Gardens)
http://reslife.tamu.edu/apartments

Available for graduate students, married students, students with dependent children, international students, U.S. military veteran students, students who are at least 21 years old, or undergraduate students who have completed at least 30 credit hours.

Fully furnished one- and two-bedroom units are available. Rent for The Gardens can be monthly or by semester and includes furniture, parking, cable TV service and high-speed Internet. Students pay electricity. All leases are either 9- or 12-month leases.

Application forms, rental rates and additional information may be obtained online.

Orientation

Orientation
New Student Conferences
http://newaggie.tamu.edu

- Held each year for undergraduate students entering Texas A&M University. New students are required to register for and attend a conference in order to accept their offer of admission and register for classes.
- During the conference, new students learn about valuable University services and meet with academic advisors for curriculum advisement and selection of first semester courses.
- Additional services and programs from the Office of New Student and Family Programs: http://studentlife.tamu.edu/nsfp
  - Howdy Week: Aggieland’s Week of Welcome - held the week before Fall classes begin
  - Family Member support and outreach including a family listserv open to all Aggie families
  - Publications for incoming students and family members - New Student Handbook and Aggie Family Calendar
  - Family Weekend - held each Spring
  - Advisement of Aggie Orientation Leader Program and Family Weekend Committee

Aggie Honor Code

Integrity is a fundamental core value of Texas A&M University. Academic integrity requires a commitment by all faculty, students, and administrators to:

- Remain constantly focused on the quality of the academic programs;
- Achieve and maintain academic excellence in all courses and programs to assure the value of Texas A&M University degrees;
- Demand high academic standards from all members of the Aggie community.

All Texas A&M University students, graduate and undergraduate, part-time or full-time, in residence or in distance education, are expected to follow the guiding rule of the Aggie Honor Code:

“An Aggie does not lie, cheat, or steal or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System, which may be found at http://aggiehonor.tamu.edu. A student will be required to state his/her commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M community from the requirements or the processes of the Honor System.

The Honor System Office is charged with promotion of the honor code and administration of academic misconduct cases. The Honor Council, comprised of students and faculty from colleges and offices across the University, will investigate all such infractions of the honor code and recommend appropriate sanctions. The office website, http://aggiehonor.tamu.edu, defines the types of infractions and the possible consequences. Students are urged to review this information.

In addition to adherence to the Honor Code, a student (graduate students in particular) who is completing a thesis, record of study, dissertation, and publication may fall under the additional federal requirements promulgated by the Office of Research Integrity (Scientific Misconduct Regulations – 42 CFR part 50), as well as Texas A&M System Regulations and Texas A&M University Rules (Texas A&M System Regulations – Ethics in Research and Scholarship – 15.99.03, and Texas A&M University rules and standard administrative procedures – Responsible Conduct in Research and Scholarship – 15.99.03.M1, 15.99.03.M1.01-06).

Aggie Honor System Office
http://aggiehonor.tamu.edu

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Extended Orientation

ExCEx Program
http://excel.tamu.edu

Texas A&M University’s Excellence uniting Culture, Education, and Leadership (ExCEL) is a student organization and freshman involvement
program designed to help freshmen find academic, social, and personal balance at Texas A&M by fostering a community where they can culturally identify. Since 1987, ExCEL has assisted freshmen in making a smooth transition from high school to college by orienting freshmen to the program through a conference, cultivating relationships between peers and mentors, providing a sense of belonging through cultural communities, offering academic support services, and serving as a resource for transitioning into Aggie life.

ExCEL launches with the ExCEL Conference the Friday before fall classes. During the conference, students become familiar with the year-long program, as they are assigned upper-class peer mentors and a peer group of freshmen. The Conference consists of motivational speakers, dialogue within the ExCEL cultural communities, introduction to developmental series focused on personal development, and meet and greet mentor activities. Following the Conference, academic, social, and cultural activities begin through the close of the spring semester. Activities include cultural community events, seminar series covering various relevant topics, mentor engagement activities, study halls, community service projects, and socials!

While ExCEL is a student-run program, you may also obtain information by contacting the Department of Multicultural Services at 979.862.2000 or in Suite 2200 in the Memorial Student Center.

Fish Camp
http://fishcamp.tamu.edu

Fish Camp is a student-run, extended orientation program intended to provide incoming freshman students the opportunity to establish friendships, meet student leaders, become familiar with Aggie traditions, and learn about Texas A&M campus life. Faculty and staff members speak on topics such as study habits, personal goals, Aggie traditions and history, involvement, and campus services. Held during a three-week period preceding the fall semester, each four-day, three-night session is designed to aid students in the transition from high school to college and, particularly, to Texas A&M.

In addition to providing educational programs, group activities, and small group discussions, the camp allows students to get to know each other through recreation, intramural sports, and evening theme mixers. Fish Camp is not just a four-day experience in August; activities and camp hangouts continue into the Fall semester. For more information on Fish Camp and how to register for a session, please visit our website.

Howdy Camp
http://atc.tamu.edu

Occurring every January, Howdy Camp is a three-day, two-night extended orientation camp hosted by Aggie Transition Camps for all students entering Texas A&M University in the spring semester.

Howdy Camp is the spring semester’s equivalent to Fish Camp and T-Camp, and offers a great way for incoming students to find community before classes begin. At Howdy Camp, new Aggies are introduced to the many traditions, indescribable spirit, and customs of Aggieland. Additionally, Howdy Camp doesn’t end when the bus leaves camp! Counselors continue to be available and serve as resources during the semester as students complete their transition into Texas A&M. Aggie Transition Camps is a sponsored student organization at Texas A&M University.

T-Camp
http://atc.tamu.edu

Held in August each year, T-Camp is a three-day, two-night extended orientation camp experience for transfer and other non-traditional students entering Texas A&M in the summer and fall semesters. Through staff presentations, student skits, and small group discussion time, new students will leave camp with knowledge about Texas A&M campus resources and many new friends.

Additionally, T-Camp doesn’t end when the bus leaves camp! Your counselors will continue to be available and serve as resources as you complete your transition into Texas A&M. Counselors will be at the T-Camp Backyard Bash during Gig ‘Em Week, will show you around the MSC Open House, and will plan frequent camp hangouts. Counselors will also coordinate campus tours so that you are not lost on your first day! T-Camp is hosted by Aggie Transition Camps, a sponsored student organization at Texas A&M University.

Venture Camp: Base Camp
http://venturecamp.tamu.edu

Venture Camp: Base Camp, the inaugural program under the Venture Camp umbrella, is an outdoor, six-day, five-night extended orientation experience that occurs in July and takes place both on the Texas A&M main campus and also in the Texas Hill Country. A collaborative program hosted by the Departments of Student Activities and Recreational Sports, Base Camp involves numerous outdoor adventures including hiking, rock climbing, camping, and paddling a river. Staff and students from Outdoor Adventures guide the trip activities during the day, and in the evening campers gather back at the campsite to participate in peer-led large and small group discussions about college and life at Texas A&M. No prior outdoor experience is required, but a willingness to be an active participant and a team player is very important! A much smaller program than the other summer extended orientation programs, Base Camp offers a more intimate extended orientation experience while also providing information important to students transitioning into college life.

Venture Camp: Veterans

Venture Camp: Veterans is the newest extended orientation program and will launch the first session in August of 2017. A collaborative effort between the Departments of Student Activities, Recreational Sports, and the Veterans Resource & Support Center, Venture Camp: Veterans is a two-day program designed to offer a combination of outdoor experiences such as paddling a river and/or rock climbing off-campus as well as peer-led, on-campus activities designed to create greater senses of confidence and competence for incoming students learning to navigate the Texas A&M campus and community. Interested individuals can learn more by contacting Sarah Edwards at sedwards@stuact.tamu.edu. (sedwards@stuact.tamu.edu)

Services for Students

Academic Advising (p. 81)
Academic Success Center (p. 81)
The Association of Former Students (p. 81)
Career Center (p. 81)
Consensual Language, Education, Awareness and Relationships (CLEAR) (p. 81)
Disability Services (p. 82)
Gay, Lesbian, Bisexual, Transgender (GLBT) Resource Center (p. 82)
Academic Advising

• Academic advising is a collaboration between a student and an academic advisor. Through teaching and learning experiences, the student sets goals, acquires information and services, and makes decisions consistent with interests, goals, abilities and degree requirements.

• Academic advising at Texas A&M University is an important component of student learning, contributing to the success of all students through:
  • Supporting student achievement of the University Learning Outcomes and commitment to learning for a lifetime
  • Being responsible to and respectful of the individual student
  • Encouraging commitment to lifetime learning by directing students toward opportunities to interpret, reflect upon, and apply their classroom experiences in ways relevant to their careers and their lives
  • Interpreting and conveying Texas A&M University's mission to students
  • Supporting the educational policies, procedures and values of the department, college and university, likewise, academic advising relies on the support and resources of the university, college and department
  • Involving other university programs, services and individuals, when appropriate in the advising process
  • Being responsible for professional academic advising, training, development and practices

Academic Success Center
http://successcenter.tamu.edu

• Academic Coaching
• Workshops and courses
• Supplemental Instruction (SI)
• Tutor Zones (TZs)/Peer Tutoring
• Texas Success Initiative (TSI)
• Transfer Student Programs (TSP)

The Association of Former Students
www.AggieNetwork.com

• Aggie Ring
• Informational and Interactive Exhibits

• Alumni Services, Giving and Events
• Traveling Aggies

Career Center
HireAggies.com

• The Texas A&M University Career Center provides comprehensive services to students in planning their careers, gaining work-related experience, seeking admission to graduate and professional school, and securing professional employment upon graduation. Our goal is to assist you every step of the way, from your freshman year through graduation, and after, as a Former Student. We offer a variety of programs, services and resources:
  • Career Exploration, Assessment, and Planning
  • Job Search Tools, Resume Writing, Interview Preparation
  • Professional Networking Resources and Events
  • Full-time positions, Internships, Externships, and Cooperative Education
  • Assistance with Professional and Graduate School applications and interviews
  • Presentations to Classes and Student Organizations, Workshops and Panel Discussions, Career Fairs, and Webinars
  • Employer Contacts, Campus Recruiting
  • Individual appointments, Walk-in Advising, Mock Interviews

• One of the largest programs of its kind in the nation, the Career Center has been recognized nationally and regionally for our many Best Practices. In a Wall Street Journal survey, recruiters ranked Texas A&M as the second most preferred university in hiring college talent nationwide. The Career Center can be found online at HireAggies.com (http://HireAggies.com) and is located in the Koldus Building, Suite 209. You can also find us on Facebook, follow us on Twitter, Snapchat and Instagram, and view us on YouTube.

Consensual Language, Education, Awareness and Relationships (CLEAR)

CLEAR is dedicated to reducing violence in Aggieland by educating students, faculty, and staff about power-based interpersonal violence and how Aggies can work to prevent it. CLEAR advises one student organization, Student Anti-Violence Educators (SAVE).

We offer presentations on a variety of topics, including the following:

• Sexual violence
• Sexual harassment
• Domestic/dating violence
• Stalking
• Healthy/respectful intimate relationships
• Consent

To request a presentation on any of these topics, visit our website at https://studentlife.tamu.edu/clear or email CLEAR at clear@studentlife.tamu.edu
For presentations on Green Dot Bystander Intervention Program visit http://greendot.tamu.edu

For more information on Texas A&M’s Step In Stand UP Campaign visit http://stepinstandup.tamu.edu

Disability Services
http://disability.tamu.edu

- Reviews and maintains student disability documentation
- Determines appropriate accommodations
- Facilitates exam accommodations
- Provides sign language interpreting and transcription services
- Obtains course materials in alternative formats
- Consults on disability-related issues

Gay, Lesbian, Bisexual, Transgender (GLBT) Resource Center
http://glbt.tamu.edu

Resource and Referral Center that provides:

- Resource Library (Books, Periodicals, Brochures and Films)
- Programming
- Education
- Advocacy
- Leadership Development
- Visibility

George Bush Presidential Library and Museum
http://Bush41.org

The George Bush Presidential Library and Museum at Texas A&M University is dedicated to preserving and making available the records and artifacts of George H.W. Bush, 41st President of the United States. We promote civic literacy and increased historical understanding of our national experience, and foster a community of public service and volunteerism. We accomplish this mission by offering:

- Rich Educational and Public Programs
- Original Museum Exhibits
- Access to our Archival Holdings
- Research Opportunities
- Special Events
- Unique Volunteer and Internship Positions
- Foundation Memberships

The George Bush Presidential Library and Museum can be found online at http://Bush41.org and is located at 1000 George Bush Drive West, College Station, Texas 77845. For additional information on the resources the George Bush Presidential Library and Museum have to offer please call 979-691-4000 for all Museum inquiries or 979-862-2251 for all Foundation or Membership inquiries.

Health Promotion
http://studentlife.tamu.edu/hp

- Provide educational health information and consultation
- Alcohol and Other Drugs, Nutrition, Reproductive Health, Sexual Health, Stress Management, etc.
- Presentations available upon request
- Body fat analysis
- Peer health educator training and outreach
- Resource tables or interactive programming available for student events

International Student Services
http://iss.tamu.edu

International Student Services provides the following support services to international students (defined as students who are not U.S. citizens or lawful permanent residents):

- Pre-arrival information
- Certificates of Eligibility (Forms I-20 and DS-2019)
- On-line Orientation and International Student Conference
- Represent the University with the Department of Homeland Security, Department of State and the Student Exchange Visitor Information System (SEVIS)
- Assist students with federal immigration regulation compliance
- Advising
- Liaison for students, university and community
- International student employment information
- Administration of some international student scholarships and loans
- Coordinate with the Texas A&M University System Student Health Insurance Plan provider and students
- Community involvement activities

International Student Services also provides these additional services to sponsored students:

- Liaison between academic departments, students and sponsors
- Acts as admission liaison for sponsored students and sponsors
- Assist with contractual agreements between the students and sponsors
- Liaison for sponsors and students regarding third party billing
- Assistance with housing, specialized letters, and some transportation

Professional School Advising
http://opsa.tamu.edu

- Medical, Veterinary, Dental, Physical Therapy, Physician Assistant, Pharmacy and Nursing Professions Advisory Services
- Law Advisory Services
- Preprofessional Student Organizations

Student Conduct Office
http://studentlife.tamu.edu/sco

- Receive and process reports of alleged student rule violations
- Presentations available upon request
Student Counseling Service
http://scs.tamu.edu
- Career Counseling
- Stress Management
- Personal Counseling
- HelpLine
- Crisis Intervention
- Therapist Assisted Online Counseling

Student Health Services
(Accredited by Accreditation Association for Ambulatory Health Care)
http://shs.tamu.edu
Clinics:
- Medical Clinics
- Women’s Clinic
- Specialty Clinics
Ancillary:
- Dietitian
- Medical Laboratory
- Pharmacy
- Physical Therapy
- Preventive Medicine
- Radiology Services
Additional Services:
- Ambulance Service/EMS
- Dial-A-Nurse
- Insurance
- Appointments – Monday - Friday, 8 a.m. - 5 p.m.

Student Legal Services
http://studentlife.tamu.edu/sls
- Notary Public
- Legal advice and counseling for Texas A&M students

Technology Resources
http://IT.tamu.edu
- Internet Access
- TAMULink Wireless Internet (http://tamulink.tamu.edu)
- Texas A&M Gmail (http://google.tamu.edu)
- 24-Hour Technical Support (Help Desk Central (http://hdc.tamu.edu))
- Campus Computer Labs (O (http://oal.tamu.edu))
- Learning Management System - eCampus (http://ecampus.tamu.edu)
- Discounted Software (http://software.tamu.edu)

University Libraries
http://library.tamu.edu
- Sterling C. Evans Library (http://evans.library.tamu.edu)
- West Campus Library (WCL) (http://wcl.library.tamu.edu)
- Medical Sciences Library (MSL) (http://msl.library.tamu.edu)
- Policy Sciences and Economics Library (PSEL) (http://pssel.library.tamu.edu)
- Cushing Memorial Library and Archives (http://cushing.library.tamu.edu)

University Police
http://upd.tamu.edu
- Law Enforcement and Criminal Investigations
- Crime Prevention Programs

University Writing Center
http://writingcenter.tamu.edu
- Online Writing and Speaking Resources – The Handouts and Guides section on http://writingcenter.tamu.edu includes print, audio, and video help for writers and public speakers.
- Face-to-Face and Online Consultations on Writing and Public Speaking – Make an appointment via http://writingcenter.tamu.edu for feedback on speeches, writing, posters, presentation slides, videos, and multimodal communication. Come in person, send work online, or meet in a web conference. You can also schedule appointments for group writing projects.
- Workshops and Studios on Writing and Public Speaking – Available for classes, workshops present information and engage participants in practice; studios combine instruction with an extended opportunity to write and seek advice from a consultant.

Veteran Resource and Support Center (VRSC)
http://aggieveterans.tamu.edu
- Aggie Veteran Network – “One-stop referral shop” for military-affiliated student resources (veterans, active duty, reserve/National Guard, dependents and survivors).
- Academic and Student Life Support – Connect with academic assistance and student life resources to meet individual requirements.
- Military Admissions Liaison – Located in the VRSC to assist veteran students in the admission process, academic credit for military service and military withdrawals.
- Vet Success on Campus – Connect with our campus VA Counselor for VA related inquiries, support and programs.
- Peer Advising for Veteran Education (PAVE) – Connect new veteran students with current veteran students to facilitate the transition to Texas A&M University.
- Student Vet Association – Student organization for veteran students. Opportunity to meet other vets and be part of the Aggie veteran community.
Veteran Services Office (Scholarships & Financial Aid)
http://veterans.tamu.edu

- Assists eligible students in securing federal and state veterans’ education benefits and other educational funding including scholarships and financial aid.

Women's Resource Center (WRC)
http://wrc.tamu.edu

- Programs include:
  - Breastfeeding Welcomed Here: A list of private, accessible space for nursing mothers to express their milk on campus. Locations can be found on the WRC website or the Aggie Map.
  - Book Club: Discussion groups led by TAMU faculty related to a book published in their field of study.
  - Elect Her: Aggie Women Win: A one day conference held in late January or early February which encourages and trains women to run for student government and future political office.
  - International Women's Day Conference: The aim of this evening conference is to bring awareness to the struggle women face internationally as well as to celebrate and empower women from all cultural backgrounds. The conference is held during Women’s History Month in March.
  - Start Smart Salary Negotiation Workshops: These workshops teach college students preparing to enter the job market about the gender pay gap, including its personal consequences; how to quantify the market value of their education, skills, and experience; how to conduct objective market research and determine a fair target salary; and how to create a strategic pitch and respond to salary offers.
  - Women's History Month Calendar: A printed calendar highlighting campus events related to Women’s History Month in March.

- Presentation topics include, but are not limited to:
  - Women’s Leadership
  - Gender Equity
  - Body Image

- Internships:
  - Book Club Intern
  - Marketing and Communications Intern
  - Graphic Design Intern

- Onsite lactation suite for mothers to express their milk
- Student organization advisor: The American Association of University Women at Texas A&M University (AAUW-TAMU)
- Offers resources and referrals to survivors of sexual violence, dating and domestic violence, and stalking

Campus Life

The Corps Experience (p. 84)
Department of Multicultural Services (p. 84)
Office of Fraternity and Sorority Life (OFSL) (p. 85)
Intercollegiate Athletics (p. 85)
Memorial Student Center (MSC) (p. 85)
Music Activities (MUSA) (p. 85)

Recreational Sports (p. 86)
Speech and Debate Team (p. 86)
Student Activities (p. 86)
Student Government (SGA) (p. 87)
Student Life (p. 87)
Student Life Studies (p. 87)
Student Media (p. 87)
University Art Galleries (p. 87)
University Center and Special Events (UCEN) (p. 87)
Vice President for Student Affairs (p. 88)

The Corps Experience
http://corps.tamu.edu

- The Corps of Cadets is the largest and most visible student organization at Texas A&M. Known as the Keepers of the Spirit and the Guardians of Tradition, many of Texas A&M’s most cherished traditions grew out of the Corps, including Midnight Yell Practice, Aggie Muster and Silver Taps. Currently, over 2,500 young men and women are Corps members.
- Most cadet graduates pursue a career in the public and private sector; however, the Corps of Cadets consistently commissions more officers than any institution other than the service academies.
- Academic excellence is the top priority of the Corps of Cadets offering scholastic advising and cadet-led support programs as well as access to state-of-the-art academic facilities.
- Cadets who pursue non-military careers declare themselves candidates for the Academic Certificate in Leadership Studies – 12 credit hours of university-recognized leadership coursework noted on the student’s official university transcript.
- The Corps of Cadets offers cadet organizations (The Fightin’ Texas Aggie Band, a precision military band; the Ross Volunteers, the official honor guard for the governor of the state of Texas; the Fish Drill Team, a precision drill unit; and Parsons Mounted Cavalry, the only mounted ROTC unit in the United States), ROTC special units (Army's Ranger Challenge Team and Rudder’s Rangers, Navy SEAL Platoon, Marine Recon Platoon and the Air Force’s Arnold Air Society) and advanced course ROTC contracts.

Department of Multicultural Services
http://dms.tamu.edu

The Department of Multicultural Services (DMS) contributes to steady progress toward institutional diversity goals of greater inclusion and academic excellence by positively impacting the campus climate.

The department has a mission to provide multiple educational and developmental services for underrepresented populations and diversity education programs that foster inclusive learning environments for all students. DMS supports, advocates for and challenges students as they transition and persist at Texas A&M, as well as provides opportunities for students to examine and communicate ways to contribute to an inclusive and respectful campus community, develop cultural knowledge and competence and build cross-cultural communication skills.

DMS is home to a number of student organizations, many of which support academic, social, cultural, and personal development, as well as opportunities for intentional interaction and engagement.
Our student organizations include Asian Presidents’ Council (APC); Black Student Alliance Council (BSAC); Hispanic Presidents’ Council (HPC); African American Student Leadership Institute (AASLI); Institute for the Development and Education of Asian American Leaders
Outside of student organizations, we offer additional educational and developmental experiences including Aggies to Aggies (A2A), Diversity Certificate Program, Aggie Black Male Connection (ABMC), Latino Males United (LMU), Women of Color Courageous Conversations; Community of Respect, Community Conversations, Cultural Explorations experiential learning experiences, Cultural Leadership Understanding and Exploration for Sophomores (CLUES), and Race Identity and Social Equity (RISE) Conference. Our department is also home to a free tutorial service providing one-on-one tutoring in specific courses and coordinates a NASPA Undergraduate Fellows Program initiative for the Division of Student Affairs. The department strives to maintain a welcoming and inclusive environment for all students.

Office of Fraternity and Sorority Life (OFSL)
http://aggiegreeks.tamu.edu

- Housed in the Department of Student Activities, the Office of Fraternity and Sorority Life’s mission is to build an inclusive fraternity and sorority community at Texas A&M and enhance the collegiate experience by supporting opportunities for leadership, academic success, civic engagement and the creation of fraternal bonds. Our office serves as a liaison among our collegiate chapters, parents, alumni, international organizations, and Texas A&M University to provide organizational guidance, educational programs, and resources while challenging members to live their fraternal values.

- Fraternities and Sororities are a fundamental part of Texas A&M University. We are home to 55+ internationally affiliated or local Greek-letter organizations governed by one of four councils: Collegiate Panhellenic Council (CPC), the InterFraternity Council (IFC), the Multicultural Greek Council (MGC), and the National Pan-Hellenic Council (NPHC). Our fraternities and sororities collectively constitute the largest membership-based and multi-faceted community on campus.

- Representing 10 percent of the undergraduate student population, fraternity and sorority members are committed to their academics, developing and strengthening their leadership skills, volunteering time in the community and continually forming a campus and cultural support network for current and incoming Aggies. Fraternities and sororities have enhanced the lives of Aggies since their inception.

Intercollegiate Athletics
www.aggieathletics.com

- Texas A&M is a member of the National Collegiate Athletic Association (NCAA) and the prestigious Southeastern Conference (SEC), which also includes the University of Alabama, University of Arkansas, Auburn University, University of Florida, University of Georgia, University of Kentucky, Louisiana State University, University of Mississippi, Mississippi State University, University of Missouri, University of South Carolina, University of Tennessee and Vanderbilt University.

- Texas A&M sponsors 20 intercollegiate athletics teams. The nine men’s programs are football, basketball, baseball, golf, indoor track and field, outdoor track and field, cross country, swimming and diving, and tennis. The 11 women’s programs are basketball, cross country, golf, indoor track and field, outdoor track and field, softball, swimming and diving, tennis, volleyball, soccer and equestrian.

- Texas A&M brought home four national champion titles in 2011 as the women's basketball team, the men's and women's outdoor track and field squads and the women's western equestrian all won their respective national championships. The track and field program accomplished the double national titles for the third straight year, a historic accomplishment in NCAA history.

- Aggie athletes have earned more than 800 All-American citations and hundreds have gone on to successful professional careers in their respective sports. In addition, Texas A&M has produced a number of Olympic athletes, including a record number of Aggies who competed in the 2012 Summer Olympic Games.

- The mission of Texas A&M athletics is “Building Champions” and it at the heart of the athletic department’s Mission Statement: “Texas A&M Athletics commits to Building Champions through academic achievement, athletic excellence and national recognition of our student-athletes, teams and programs. We provide our student-athletes with all the necessary tools for them to be Champions in their sport and in life. The integrity of our program takes root in the tradition and spirit of Texas A&M, bringing honor and distinction to our University.”

Memorial Student Center (MSC)
http://msc.tamu.edu

- Programming at the MSC, Texas A&M’s student union, enriches the living and learning experience in Aggieland. The MSC’s student-managed program committees produce hundreds of programs each year in the arts, cultural and educational awareness and exploration, leadership development, and service projects on campus and in the community. Our programs include the OPAS performing arts series, art exhibitions in the MSC Reynolds Gallery, concerts, weekly films, lectures and speakers discussing current events and national affairs, the MLK Breakfast, Salsa Dance Night, and MSC Open House. The MSC also promotes international awareness through on-campus programs and internships abroad.

- MSC programs also offer students excellent academic, personal, and professional development opportunities. Student program committee members learn leadership and professional skills through the experience of managing their own organizations and producing programs for the campus community. Students can get practical experience in budgeting, communication, fund development, team development, program planning and logistics, meeting facilitation, public speaking, and even technical skills such as running sound for a concert or installing an art exhibit.

- The MSC Box Office provides students and organizations with convenient and affordable ticketing, cash handling, and sales services. The Box Office makes selling easier by eliminating the worry and risk of cash handling by providing online sales and by providing extensive reporting capabilities that take the hassle out of accounting tracking sales and cash flow.

Music Activities (MUSA)
http://musa.tamu.edu

Band Opportunities

- Fighthin’ Texas Aggie Band – The Fighthin’ Texas Aggie Band is nationally known for its precision military marching formations on the football gridiron and is the largest military marching band
Choral Opportunities

- University Concert Bands – Wind Symphony, Symphonic Winds, Symphonic Band and Concert Band. These ensembles consist of outstanding wind and percussion players from all areas of the Texas A&M campus. Literature performed by the bands is chosen from the best of traditional and contemporary band works. The bands perform at least two concerts per semester and occasionally participate in off-campus concerts and tours. Students from all majors are welcome in the band, and Corps of Cadets membership is not required. An audition is required to participate in the bands. Please refer to our website (http://musa.tamu.edu) for more information.

- University Jazz Ensembles – These two groups utilize standard 17-piece, large jazz ensemble instrumentation for 13 winds and 4 rhythm section instruments. The bands perform select literature from the best traditional and contemporary big band jazz repertoire. The ensembles perform at least two concerts each semester, including campus and community performances. An audition is required to participate in the jazz ensembles. Please refer to our website (http://musa.tamu.edu) for more information.

- Hullabaloo Band – The Hullabaloo Band is housed in the Athletic Department and is a sponsored student organization, consisting of 100 student musicians that support Texas A&M Volleyball, and Men’s and Women’s Basketball. The band regularly travels to tournaments with the teams during postseason play. An audition is required to participate in the Hullabaloo Band. Please refer to our website (http://www.12thman.com/sports/2015/3/23/GEN_20140101165.aspx) for more information.

Choral Opportunities

- Century Singers – The Century Singers is a close-knit family that connects through a shared passion for music. Members also have the opportunity to participate in events throughout the year including overnight retreats and activities such as ice-skating, movie nights, and group dinners. Involvement in both social gathering and formal rehearsals brings members together as Aggies, musicians, and friends. This creates a truly unique and rewarding experience that will be remembered for a lifetime. An audition is required to participate in the Century Singers. Please refer to our website (http://musa.tamu.edu) for more information.

- Singing Cadets – The purpose of the Singing Cadets is to enhance the public relations of Texas A&M University through musical presentations as deemed appropriate by the Director and to develop disciplined leaders of character as defined by the Singing Cadet Handbook. The four pillars of the Singing Cadets are Purpose, Unity, Spirit, and Honor. Together, these four pillars have formed the solid foundation that has inspired and enabled our organization to succeed in carrying out its purpose for over a century. An audition is required to participate in the Singing Cadets. Please refer to our website (http://musa.tamu.edu) for more information.

- Women’s Chorus – The Texas A&M Women’s Chorus is a recognized student organization that strives to promote excellence in the fine arts and to encourage cultural expansion at Texas A&M. They also aim to provide entertainment for the campus community, and to enhance the perception of the ensemble at all levels. The choir travels throughout Texas, beyond our state borders, and internationally, and performs a varied repertoire of sacred and secular classical selections. An audition is required to participate in the Women’s Chorus. Please refer to our website (http://musa.tamu.edu) for more information.

Orchestral Opportunities

- University Orchestras – The orchestra program at Texas A&M consists of two orchestras; the Chamber Orchestra and the Philharmonic Orchestra. Both of these groups are comprised of students from all majors at the university. Both orchestras provide students with outstanding musical experiences while allowing time for academics and other interests. Students in the orchestras perform the best of both string and symphony orchestra literature at a high level of artistic achievement in a focused and supportive environment. An audition is required to participate in the orchestras. Please refer to our website (http://musa.tamu.edu) for more information.

Recreational Sports

http://recrecports.tamu.edu

- Most Texas A&M students are automatically Rec Members. All you need is your student ID to utilize the Student Recreation Center (Rec Center) and other Rec Sports facilities. Persons with disabilities are invited to contact Member Services to inquire about accommodations.

- Drop-in recreation encompasses the use of recreational facilities such as swimming/diving pools, walking/jogging track, handball/racquetball courts, and indoor soccer, basketball, volleyball and badminton courts. The Rec Center also features a bouldering wall, an indoor rock climbing facility, outdoor basketball and sand volleyball courts, extensive strength and conditioning areas, dance/activity rooms, and a world-class natatorium featuring indoor and outdoor pools and a diving well. Facilities may be used on a drop-in basis except when reserved for classes or university functions. Daily guest passes are available for visitors.

- Rec Sports also offers aquatics classes, group exercise classes, endurance programs and boot camps, personal training, specialty classes, massage therapy, intramural sports, the Texas A&M Sport Clubs program, Outdoor Adventures, CPR certification classes, and the Walk of Champions brick campaign.

Speech and Debate Team

http://speech.tamu.edu

- Compete at national level while impacting the community and the world at a grassroots level.

- Compete in debate, public address events, individual limited preparation events and oral interpretation events.

- Student-run, student-funded and student-oriented organization.

Student Activities

http://studentactivities.tamu.edu

- Student Activities is the premier resource hub for the many leadership and involvement opportunities on campus. At Texas A&M, we care about helping Aggies develop skills both in and out of the classroom, preparing you for life beyond Aggieland. Whatever it is that you love, Student Activities is here to help you practice your passion through involvement in one of our 1000+ student organizations. The perks of getting involved range from reaching your
leadership potential to networking with administrators and potential employers to forming lasting friendships.

- The Department of Student Activities houses key involvement opportunities, including the 50+ fraternity and sorority chapters that can be found in our Center for Fraternity and Sorority Life. The Student Government Association and the Texas A&M Class Councils offer opportunities for those who are passionate about representing the student voice and hosting Texas A&M traditions.

- At Texas A&M, Aggies are held to a high standard of leadership and selfless service. To promote and develop these qualities, our Leadership and Service Center offers a number of leadership programs to help you reach your leadership potential, including the Maroon & White Leadership Fellows, and it also houses several service-based organizations such as The Big Event and Aggie Replant. We also provide a way for Aggies to connect and volunteer with local community agencies through our AggieServe database (http://aggieserve.tamu.edu).

### Student Government (SGA)
[http://sga.tamu.edu](http://sga.tamu.edu)

- SGA is comprised of the executive, legislative and judicial branches. Members of these branches work to advocate for student needs and help better the Texas A&M campus.

- In addition, SGA has four commissions — Development, Election, Diversity and Legislative Relations. Each of these serve to carry out the goals of the Student Body President from fundraising money for all of SGA to advocating for students at the state level.

- Finally, SGA houses 14 committees including CARPOOL, The BIG Event, Muster and more. These committees strive to enhance the student body through their leadership, programs, conferences and traditions, and they directly have an impact on the student body and community.

### Student Life
[http://studentlife.tamu.edu](http://studentlife.tamu.edu)

- The Offices of the Dean of Student Life strive to enhance your opportunities as a student to participate fully in the University experience. We do this by providing you with information, services, programs and involvement opportunities that facilitate responsible life choices and promote awareness of yourself and your community. Each of the program areas within the Offices of the Dean of Student Life has a specific mission, but one common goal: to provide education, outreach, and support to you.

- Additionally, the department advises the following student organizations: Aggie Orientation Leader Program (AOLP), American Association of University Women at Texas A&M University (AAUW-TAMU), Graduate & Professional Student Council (GPSC), the Family Weekend Committee and The Sex Project.

- Specific services and programs offered include:
  - Consensual Language, Education, Awareness and Relationships (CLEAR)
  - Gay, Lesbian, Bisexual, Transgender Resource Center
  - Health Promotion
  - New Student & Family Programs
  - Off Campus Student Services
  - Student Assistance Services

### Student Life Studies
[http://studentlifestudies.tamu.edu](http://studentlifestudies.tamu.edu)

- Facilitates the Division of Student Affairs and student organizations in the assessment and evaluation of services and programs and assists in expanding the knowledge base about Texas A&M students and their co-curricular experiences. Department staff can assist with the development of assessment instruments and the collection and analysis of data including web-based programs.

### Student Media
[http://studentmedia.tamu.edu](http://studentmedia.tamu.edu)

- Student Media produces national, award-winning publications; The Battalion newspaper and the Aggieland yearbook. Both are written, edited and produced by students and offer excellent opportunities to gain valuable experience for journalistic and related careers.

- The Battalion is published Monday through Thursday during fall and spring semesters and typically on Tuesday and Thursday during the summer sessions. It is distributed to students, faculty and staff on campus and at many apartments and other high traffic areas in College Station. The Battalion also is available online and on mobile devices at thebatt.com.

- The Aggieland is distributed in the fall but is a year-round project documenting school activities. It is one of the nation’s largest college yearbooks.

### University Art Galleries
[http://uart.tamu.edu](http://uart.tamu.edu)

- The University Art Galleries (UART) Department (supports the educational mission of Texas A&M University by providing impactful visual arts experiences to diverse campus and regional community audiences. UART serves as steward of its collections, promoting arts advocacy and engagement across the university. It is responsible for visual art exhibitions at the J. Wayne Stark Galleries, the Forsyth Galleries and for art inventories at Texas A&M.

- The program organizes the major art exhibitions for the University; advises on the selection, display and management of visual art objects on the campus; handles all art and art-related gifts to the University; and provides guidance and support to all exhibitions and collections at the University. The department also maintains the outdoor sculpture collection for the university.

- In addition, the University Art Galleries department organizes programs to complement exhibitions; has a docent program, which provides guided tours of changing exhibitions on campus and the University’s permanent collections to interested community and school groups as well as other art education programs.

### University Center and Special Events (UCEN)
[http://ucenter.tamu.edu](http://ucenter.tamu.edu)

- Student Conduct Office
- Student Legal Services
- Student Media (The Battalion and Aggieland yearbook)
- Women’s Resource Center
• University Center and Special Events (UCEN) is a highly skilled team of professionals committed to creating extraordinary guest experiences. We provide exceptional event management and technical support in state-of-the-art facilities that are well maintained, safe and clean. Through our facilities and services, we enhance the educational, business, social and cultural experiences of students, faculty, staff and visitors of Texas A&M University.

• Event Services – located on the second floor of Rudder Tower, the Event Services team assists in the booking, coordination, setup and staffing of meetings and events held in the Memorial Student Center (MSC), J. Earl Rudder Conference Tower, John J. Koldus Building, All Faiths Chapel, and the surrounding outside event spaces.

• Special Events – located on the first floor of Rudder Theatre Complex, the Special Events team assists with the booking of space in Rudder Theatre Complex, which includes Rudder Auditorium, Rudder Theatre, Rudder Forum, and the Exhibit Hall. Additionally, our Special Events team provides AV technical support, event setup and support, equipment rental and event consultation for events held outside of UCEN facilities.

• University Center Guest Suites – located in the Memorial Student Center (MSC), the University Center Guest Suites are an ideal and convenient place for housing speakers, visitors, and out-of-town guests. With an offering of 800 square feet, each suite includes a living room, kitchenette, king bedroom, full bath and vanity. Individually decorated, each suite welcomes guests with tailored amenities, exemplary service and an experience which embraces university traditions and values.

**Vice President for Student Affairs**

http://studentaffairs.tamu.edu

In support of the Texas A&M University mission, the Division of Student Affairs contributes to student learning and development. The Division provides exceptional services, facilities, and programs that promote student success, embody the Aggie spirit, and foster a diverse and inclusive campus community to deepen the understanding and individual application of the Aggie Core Values - Loyalty, Integrity, Excellence, Leadership, Selfless Service and Respect.
TUITION, FEES AND OTHER FINANCIAL INFORMATION

General Information
Educational expenses for nine months will vary according to personal needs and course of study. The Financial Aid Office's basic budget for new undergraduate students including tuition and fees, books, supplies, transportation, on-campus room and board, incidental and living expenses comes to about $27,272. Total expenses for returning students during an academic year should be slightly less than those for new students. The cost for new nonresident or international students is about $47,448. All tuition and fee amounts provided herein represent the most accurate figures available at the time of publication and are subject to change without notice. University Rules in place at the time of publishing are reflected here. All are subject to change. The most current information available will be maintained on the Scholarship & Financial Aid (http://financialaid.tamu.edu) website. Student Business Services online tuition and fee estimate calculator can be found at the Student Business Services (http://sbs.tamu.edu) website.

Payment of Tuition and Fees
Students must meet all financial obligations to the University by their due dates to avoid late penalties. Failure to pay amounts owed may result in cancellation of the student’s registration and their being barred from future enrollment and receiving official transcripts. State law requires that tuition and fees be paid prior to the first day of classes. Students who wish to pay fees in installments can select the option on the My Finances tab on the Howdy (http://howdy.tamu.edu) Portal.

Obligation to Pay Tuition, Required Fees, Other Fees and Charges for Optional Services
By registering for classes, students agree to pay all tuition and required fees associated with their registration, optional services and other fees, whether paying in full or utilizing the installment payment option. Failure to pay tuition, fees and other charges may result in penalties, late registration fees and/or possible cancellation.

Financial Obligation for Graduating Students
According to Texas A&M University Student Rules and Chapter § 54.007 (c) of the Texas Education Code, all financial obligations to the University must be paid by the end of the semester. Failure to settle all financial obligations will result in withholding a student’s diploma at graduation. Additionally, a block will be placed on the student’s account which will prohibit registration in subsequent semesters and receipt of official transcripts.

Citations
- Section 14.15 of the Texas A&M University Student Rules states “The student must have settled all financial obligations to the University.”
- Chapter § 54.007 (c) of the Texas Education Code states “A student who fails to make payment prior to the end of the semester may be denied credit for the work done that semester.”

Tuition
Texas A&M Tuition and Required Fees per Semester Credit Hour
All rates are the most current available at the time of printing and are subject to change. Please refer to the Student Business Services website for the latest tuition and fee information.

Nonresident Tuition Waiver
If you have any questions concerning your eligibility for a waiver of nonresident tuition, please visit our website (http://sbs.tamu.edu/accounts-billing/forms/waivers-exemptions) or contact Student Business Services at (979) 847-3337 or by email at sbs@tamu.edu.

Undergraduate Tuition

<table>
<thead>
<tr>
<th>Locked Rate Cohort (Tuition Only)</th>
<th>UG Resident (12 Hours-varies by college)</th>
<th>UG Non-Resident (12 Hours-varies by college)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013</td>
<td>$2,885.35 to $3,676.96</td>
<td>$12,081.76 to $12,873.37</td>
</tr>
<tr>
<td>2013-2014</td>
<td>$2,934.92 to $3,735.27</td>
<td>$12,224.08 to $13,024.43</td>
</tr>
<tr>
<td>2014-2015</td>
<td>$2,985.22 to $3,794.44</td>
<td>$12,368.49 to $13,177.71</td>
</tr>
<tr>
<td>2015-2016</td>
<td>$3,074.47 to $3,899.31</td>
<td>$12,745.82 to $13,570.66</td>
</tr>
<tr>
<td>2016-2017</td>
<td>$3,339.50 to $4,339.50</td>
<td>$13,533.52 to $14,533.52</td>
</tr>
<tr>
<td>2017-2018</td>
<td>$3,429.77 to $4,447.73</td>
<td>$16,805.40 to $17,823.36</td>
</tr>
<tr>
<td>2017-2018 Variable Rate</td>
<td>$3,265.55 to $4,283.51</td>
<td>$16,296.29 to $17,314.25</td>
</tr>
</tbody>
</table>

University Advancement Fee
The University Advancement Fee is a required fee charged to all Texas A&M University students. It is assessed at a rate of $242.44 for the first hour plus $85.69 per additional hour. The University Advancement Fee funds services such as advising, the Career Center, University Writing Center, technology and libraries as well as administrative services such as ID services, the campus bus system, billing and refunds, access for students to discounted software and many of the services provided through the Division of Student Affairs.

CEHD Teacher Preparation Program
Undergraduate students enrolled in the professional phase of teacher preparation programs incur a differential tuition charge of $300 in each of the remaining fall and spring semesters. This differential tuition helps support field experiences, supervision, scholarships and international/urban experiences in culturally diverse settings.

Distance Education Administration Fee
This $30 per semester credit hour administrative fee is assessed to Non-Funded Out-of-State students taking distance education courses.
Distance Education Differential Tuition

The rate to be charged for distance education courses will range from a minimum of $40/SCH to a maximum of $550/SCH. Each academic department will have an individual rate that will be approved annually by the President of Texas A&M University. For more information regarding Distance Education Differential Tuition, please visit http://sbs.tamu.edu/accounts-billing/tuition-fees/schedule/#DIST_ED_DIFF.

TAMUHSC Tuition and Required Fees

Texas A&M University Health Science Center tuition and fees are approved by The Texas A&M University System Board of Regents within guidelines established by the Texas Legislature. Fees are subject to change by the Board of Regents.

Additional information regarding the TAMUHSC Student Business Services Office and its services may be found online at the Student Business Services website.

TAMUHSC Student Business Services may be reached at 979-847-3337 or at sbs@tamu.edu.

TAMUHSC Tuition

<table>
<thead>
<tr>
<th>Department (Tuition Only)</th>
<th>UG Resident (12 Hours-varies by program)</th>
<th>UG Non-Resident (12 Hours-varies by college)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing</td>
<td>$2,188.86 to $2,251.70</td>
<td>$7,547.53 to $7,715.95</td>
</tr>
<tr>
<td>Dental Hygiene</td>
<td>$1,532.75 to $1,557.00</td>
<td>$6,964.99 to $7,045.65</td>
</tr>
<tr>
<td>Public Health (Upper Level)</td>
<td>$1,650.88 to $1,683.36</td>
<td>$7,077.62 to $7,166.44</td>
</tr>
</tbody>
</table>

TAMUHSC Fees

Distance Education Administration Fee

This $30.00 per semester credit hour administrative fee is assessed to Non-Funded Out-of-State students taking distance education courses.

Field Trip Fees

Field trip fees are assessed to cover the cost of providing trips and vary depending on the course taken and expected expenses.

Group Hospital Fee

The group hospital fee supports provision of medical services to students to access services at the academic locale.

Instructional Enhancement/ Equipment Fee

The Texas A&M Health Science Center charges an Instructional Enhancement Fee (IEF) at each of the colleges offering TAMUHSC academic programs. The colleges have varying fee rates based on the IEF needs of the college. This fee supports an array of educational activity enhancing academic programs at the college. A few examples of enhancement expenditures are; software to enhance education, media, web-based instruction, tracking and evaluation tools, licensure fees, and integration of technology.

Publication ASDA/ ADHA Fee

This fee provides for students to receive a monthly publication, annual membership into the ASDA, ADA, or ADHA, and many leadership opportunities depending on the student’s academic program.

ID card (1 time flat rate)

This additional ID fee covers the College of Dentistry badge, which also serves an access card to secure locations of the dental school in addition to being an identification card.

Matriculation Fee (1 time flat rate)

This is a setup fee for first year dental students related to college specific file set up with the college.

Drug Testing Fee (1 time flat rate)

All dental students pay this fee to cover drug testing for students, and this is a one-time assessment.

Lab Fee

The University is required to assess and collect a laboratory fee not less than $2 nor more than $30.00 for each laboratory course to cover in general the cost of laboratory materials and supplies used by a student.

Medical Liability

Medical Liability Insurance is required by students interacting & treating patients. This fee covers medical malpractice required for this type of activity.

Equipment Usage

This fee supports costs associated with instrument usage during the dental education.

Summer Clinic Fee (D3 and D4 only)

The Summer Clinic Fee is use to partly cover the cost of students working in the clinic, this fee is a flat fee and isn’t charged by the hour. (The students are scheduling and working on patients as part of their clinical training.)

Clinical Simulation Fee

Fee covers costs associated with Clinical Learning Resources Center to include specialized simulation technology, equipment, materials and supplies related to the operating of the simulation center.

Gross Anatomy Fee (M1 Only)

Fee covers costs associated with Gross Anatomy lab to include lab materials, supplies, furnishings, software and equipment specific to gross anatomy

Professional Liability Fee

Professional liability insurance coverage is required of all students who will be in clinical settings providing patient care. It is a mandatory requirement of all local facilities with which we have contracts for student clinical experiences.

Clinic Simulation Fee
Fee covers costs associated with Clinical Learning Resources Center to include specialized simulation technology, equipment, materials and supplies related to the operating of the simulation center.

**Professional Activity Fee**

The Professional Activity Fee supports various professional activities for pharmacy students such as participation in clinical partnerships enhancing experiential education, financial resources to ensure these clinical experiences meet pharmacy education expectations, support of student travel to professional meetings/conferences, and other professional activities.

**Professional Development Fee**

One-third of the pharmacy curriculum is experiential education, which consists of the Introductory Pharmacy Practice Experiences (IPPE) and the Advanced Pharmacy Practice Experiences (APPE). This fee supports clinical site payments for student rotations. In addition to clinical site payments, the Professional development Fee supports service learning activities and other professional development services and programs.

**Environmental Service Fee**

This fee supports distribution, maintenance and pick up of recycle bins and materials from each building located on the Texas A&M University-Kingsville campus. Only pharmacy students located at Kingsville are assessed this fee.

**Career Services & Professional Services Fee**

This fee will support efficient and effective support services for professional career development services. Various operational costs associated with provision of professional career development services.

**Advising Services Fee**

This fee will provide advising support services for all graduate degree programs not provided by members of the faculty. This fee includes, but is not limited to Graduate Studies, Professional School Advising, and Admission Services related to student enrollment. Various operational costs associated with the delivery of services noted in programmatic justification.

**Locked and Variable Rate Tuition Plans**

Beginning with the Academic Year 2016-2017, incoming undergraduate students at Texas A&M University will be offered the choice between a variable rate tuition plan or a locked-rate (fixed) tuition plan allowing students and their parents to better plan and budget for college expenses. You will need to select the best option for you and your family prior to registration.

**Variable rate plan:** Tuition and fees could increase each year, using the Higher Education Price Index.

**Locked-rate (fixed) plan:** Tuition and fees are locked into a per semester rate for 12 consecutive semesters, or 4 years, from the point of initial enrollment at a public or private institution. Those paying non-resident tuition will be billed the state mandated non-resident rate, but other required fees will remain locked.

**Entering freshman:** Will choose either the variable rate or the locked-rate (fixed) associated with their first term of enrollment.

**Entering transfer or readmits:** Have three options to choose from

- Variable rate, which will vary each academic year
- Locked rate (fixed), based on their first term of enrollment in college after high school, which will expire at the end of 12 consecutive semesters, or 4 years from that first term of enrollment
- The current academic year’s tuition and fee rate which will be locked in for 12 consecutive semesters or 4 years

**Presumptions made:**

Students will enroll in 30 hours an academic year for 4 years allowing completion of most degree plans. Some majors such as engineering and architecture are offered 1-2 additional semesters at the locked rate.

**Where do I select my tuition rate?**

All incoming freshmen and admitted transfer and readmit applicants must select a rate prior to registration. Rate code selections can be made by logging in to the Howdy Portal at howdy.tamu.edu, selecting the My Finances Tab and following the instructions. The choice will be offered only once and cannot be changed in future semesters.

Tuition estimates can be found on the Student Business Services website at http://sbs.tamu.edu/.

Texas A&M University meets requirements of the Texas Education Code, Section 54.017 regarding fixed tuition for undergraduate students.

**Fees**

<table>
<thead>
<tr>
<th>Convenience Fee</th>
<th>Distance Education and Other Nontraditional Course Offerings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required</strong></td>
<td><strong>DE</strong></td>
</tr>
<tr>
<td><strong>Tuition</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>University Advancement Fee</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Cooperative Education Fee</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Distance Learning Fee</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Equipment Access Fees</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Field Trip Fees</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Health Center Fee</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>International Student Services Fee</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Laboratory Fees</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

Texas A&M University Undergraduate Catalog 91
Tuition, Fees and Other Financial Information

Property Deposit | Yes | Yes | Yes | Yes | Yes |
Recreational Sports Fee | No | No | No | No | No |
Sponsored International Student Fee | Yes | Yes | Yes | Yes | Yes |
University Center Complex Fee | No | No | No | Yes | No |

1. Distance Education Instruction: This group includes traditional off-campus classes, all university centers and telecommunications, video and other nontraditional Distance Education Instruction delivery models.

2. In Absentia: The traditional student who is performing individual research or completing degree requirements that do not require classroom instruction.

3. Cooperative Registration: Students participating in the Cooperative Education Program at Texas A&M University.

4. Texas A&M University Graduate Students–Galveston: Texas A&M graduate students who enrolled at College Station, but who are taking courses exclusively at Galveston.

5. Study Abroad: Students participating in the Texas A&M University Study Abroad Program.

Application Fees
Graduate: $50; Undergraduate: $75; International: $90

Cooperative Education Fee
A fee of $75 is charged to all participants of the Cooperative Education program.

Field Trip Fees
Field trip fees are assessed to cover the cost of providing trips and vary depending on the course taken and expected expenses.

Laboratory Fees
The University is required to assess and collect a laboratory fee not to exceed $30 for each laboratory course to cover in general the cost of laboratory materials and supplies used by a student.

Late Penalties
Students who fail to pay fees and installments when due are assessed a late payment fee for each payment or installment paid late.

Late Registration/Add Penalties
- Students who register on or after the first day of classes, but before the 13th day of classes are assessed a $100 late registration fee.
- Students who register after the 12th class day are assessed a $200 late registration penalty.
- Students who add classes after the 12th class day that result in a net increase in hours enrolled are assessed a $50 late add fee.

Microfilming, Binding and Collating
Binding, collating, microfilming theses and dissertations—Masters: $110, Doctoral: $170

New Student Conference Fee
A non-refundable new student orientation fee of $100 is charged to all students. An additional fee of $35 is required of all international students to cover additional costs associated with orientation programs.

ROTC Uniform Rental
Qualifying cadets enrolled in Army, Air Force or Naval ROTC will be reimbursed the cost of basic cadet uniforms. Cadets who are not enrolled in ROTC (Drills and Ceremonies Cadets) are required to pay for use of uniforms.

Supplementary Fee for Courses Attempted More than Twice
A non-repeatable course that is attempted by a student more than twice at a public institution of higher education in Texas may not be reported for state funding. As a result, the institution must either pass the non-funded portion to all students, or charge a supplementary fee to the student who is attempting the course more than twice. Texas A&M has chosen to assess a supplementary fee to those students attempting a course more than twice.

A student attempting non-repeatable courses more than twice at Texas A&M University will be subject to a supplementary fee of $125 per semester credit hour ($375 for a 3 hour course) for the repeated course, in addition to tuition and required fees associated with the course.

Students will be notified at the time they register for a course that it has been taken twice at Texas A&M and is subject to the supplementary fee.

Diploma/Graduation Fee
A non-refundable fee per degree sought is assessed the semester a student applies for graduation. This fee is payable each time a student applies for graduation. A late fee of $50, in addition to the diploma/graduation fee, may be charged to those who apply for graduation after the published deadline.

Health Center Fee
This $72.50 per semester fee ($25 for a 5-week summer term and $72.50 for a 10-week summer term) is required of all students for the purpose of operating, maintaining and equipping the University Health Center and entitles the student to its services. These services do not include surgical operations or charges for consultations with outside physicians.

Identification Card (Aggie Card)
Every student is required to have a student ID card. ID cards are permanent and students are responsible for maintaining a working ID throughout their career at the University. The Aggie Card is used for residence hall access, registration, fee collection, financial aid disbursement, dining halls, athletic event and recreational sports admittance and library privileges. Replacement ID cards are $12. Students who lose their IDs can report the loss immediately and deactivate their card online at http://myaggiecard.tamu.edu or by contacting:
Student Business Services
Aggie Card Office, General Services Complex
(979) 845-4661
8 a.m.–5 p.m., Monday through Friday

**International Student Health Insurance**

International students with F or J visa/status, and enrolled at Texas A&M University, are required to have health insurance. International students will be automatically enrolled in and charged for the System Student Health Insurance Plan (SSHIP) unless they apply for and are granted the waiver. The waiver deadline and criteria are posted at the International Student Services web page, http://iss.tamu.edu.

Please see the Texas A&M University System rule for information regarding the rules related to student health insurance. http://policies.tamu.edu/26-99-01.pdf

**International Student Orientation Fee**

This $35 fee is a one-time fee charged to cover the cost of orientation programming for international students during their first semester of enrollment.

**International Student Services Fee**

This $46 fee ($23 for a 5 week summer term and $46 for a 10 week-summer semester) is required of all students who are not U.S. citizens or Lawful Permanent Residents to offset the cost of specialized services International Student Services or the English Language Institute provides to these students, such as immigration advising, certificate of eligibility document issuance (I-20/DS-2019), verification and monitoring of legal status, status changes, extensions of legal status, approve or help with the approval of on and off campus work authorizations, social/academic adjustment, administration of special scholarships and programs for these students.

**Recreational Sports Fee**

This $106 per semester fee ($53 for a 5-week summer term and $106 for a 10-week summer semester) is assessed to all students attending the University for use of the Student Recreation Center.

**Reinstatement Fee**

Students who fail to pay all fees by the last day of the semester will be administratively withdrawn from the University and charged a $50 reinstatement fee.

**Sponsored International Students**

An administrative fee not to exceed $500 per semester or summer session (all or part thereof) will be required to support international sponsored students whose programs are coordinated through International Student Services, unless these fees are waived as part of negotiated contractual agreements.

**Student Center Complex Fee**

This $100 fee ($50 for a 5-week summer term and $100 for a 10-week summer semester) is required of all students for operating, maintaining, improving and equipping the Student Center Complex.

**Optional Services**

**Athletic Events**

All Sports with Football—student tickets for all home sports (for all fall and spring sports) $290.

Maroon and White Packages- $150

**Installment Payment Option**

Students who choose to pay using the installment plan pay a $15 installment payment service charge per semester (excluding the Summer term.) This charge is non-refundable once a payment has been made or after the first installment due date.

**MSC OPAS Tickets**

Special Discounted Student OPAS tickets are available through the MSC Box office. For more information, please contact MSC OPAS at (979) 845-1661 or visit their website (http://mscopas.org).

**Yearbook**

The cost is $81.19 including shipping and sales tax.

**Campus Dining**

Freshmen (classified as U1s with less than 30 hours of college credit when they initially apply to live on campus) will be required to have a minimum dining plan for the full academic year (or remainder of the academic year for those that apply for housing after the beginning of the fall semester).

All Corps of Cadets members are required to have a dining plan, as designated by the Office of the Commandant.

Upperclassmen and students who are not campus residents are not required to purchase a Dining Plan, but the option is available.

All Dining Plans are loaded onto the Student ID card to make access and use easy.

Fees for the selected meal plan will be added to your Texas A&M University student fee, and are separate from housing fees. Any plan purchases or additions made after the ninth week of class cannot be charged to the student’s account and must be paid via credit card. Please visit our website for official date as it may vary each semester based on the academic and billing calendars.

Students have the option to select a Dining Plan that fits their individual needs. Dining Plans are designed to be flexible for an array of lifestyles and appetites. Smaller Dining Plans are available for upperclassmen and students who live off campus. Most Dining Plans include 2 parts: First, “Meals,” which can be used at the all-you-care-to-eat dining halls, or in select retail locations as a “meal trade.” The second part of the dining plan consists of “Dining Dollars.” These declining balance dollars can be spent like cash or a debit card, and are accepted at all University Dining kiosks, coffee shops, food courts and dining centers. Each purchase is automatically deducted from the account.

When paying with Dining Dollars, patrons will enjoy a discount on the door rate at Duncan, Sbisa, and The Commons, the all-you-care-to-eat dining halls on campus.
Dining Dollars roll over from fall to spring with the purchase of a spring dining plan.

Dining Dollars are only accepted on campus, assuring parents and guardians that this money is spent only on food and beverages.

Applicable sales tax will be added at checkout.

**Parking Permit**

Vehicles parked on the Texas A&M University campus are required to display a valid parking permit, except for those parked in designated visitor’s spaces. Costs of permits are prorated and subject to change. For more information or to purchase a permit, visit [http://transport.tamu.edu](http://transport.tamu.edu).

<table>
<thead>
<tr>
<th>Permit</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Lot</td>
<td>$300</td>
</tr>
<tr>
<td>Night Permit (only valid 5pm - 6am)</td>
<td>$96</td>
</tr>
<tr>
<td>Garage Non-Reserved Space</td>
<td>$485</td>
</tr>
<tr>
<td>Motorcycle Permit - including mopeds and scooters</td>
<td>$96</td>
</tr>
</tbody>
</table>

**Residence Hall and Apartment Room Rates**

All students living in residence halls or apartments are required to pay room rent. Rooms are furnished with beds, mattresses, desks, chairs and dressers. Students are expected to furnish their own pillows, blankets and linens internet and basic tv service. Room rates include heat, air-conditioning, lights and cleaning of common areas. Rates are for the semester and are subject to change.

For more information, please see [Residence Life](http://reslife.tamu.edu).

**Payments**

**Scholarships, Grants and Loans**

All financial aid or loans must be accepted and requirements completed before it can be applied toward a student’s account.

**Payment Methods**

Texas A&M utilizes online statements and electronic payments in its efforts to provide timely financial information to students and to control costs. Student account payment options include:

**Electronic/Online**

Students can view their account and make online payments using E-Checks, American Express, Discover Card or MasterCard by selecting “Pay Bill/Manage Account” on the My Finances tab in the Howdy portal. Payments made with credit cards will incur a convenience fee charged at the time of payment. Payments made with credit cards will incur a 2.25% convenience fee minimum charge of $3.00. Additional forms of payment accepted include: personal check, cashier’s check, wire transfer and Pin Debit. (Please Note: Once online payment transaction has occurred, the Convenience Fee is non-refundable).

**Paper**

- Checks – Students may still use paper checks for payments. The University reserves the right to utilize check conversion technology to convert paper checks into electronic format.
- Cashier’s checks
- Money orders
- Cash is not accepted
- Flywire
  - All bank wire transfers are accepted using our partner, Flywire. Texas A&M University does not accept direct wire transfers and will not provide our banking information.

**Returned Payments**

Any payment that is rejected for payment by the paying bank, credit card company or other financial institution is subject to returned item charges of $30 or more. Rejected payments may also result in cancellation of the student’s registration and additional late registration penalties if the student is required to re-register on or after the first day of classes.

**Installments**

Tuition, required fees, room, board and parking are payable in full, or in installments. A $15 per semester service charge, to cover the cost of handling, will be assessed to each student who chooses to use the installment plan. Students may pay their account in full any time during a semester; however, the service fee will not be refunded once a payment is made under the installment plan or after the first installment due date. See the Student Business Services ([http://sbs.tamu.edu](http://sbs.tamu.edu)) website for information on installment plans.

**Deposits**

**General Deposit**

A deposit of $100 is required of every student to insure the institution against losses, damages, and breakage for which the student is responsible, or to be used to offset in part amounts owed by the student to the institution. General deposits are returned to students, less any such amounts owed to the institution, within a reasonable period after the date of the student’s withdrawal or graduation from the institution, not to exceed 180 days. The deposit retention period provides the University sufficient time to identify all amounts owed, and to determine if the student intends to enroll in the semester or summer session immediately following the student’s withdrawal or graduation or, if the student withdraws or graduates in the spring semester, in the next fall semester. If a student leaves the University without graduating or officially withdrawing, they must submit a written request to Student Business Services to receive a refund of their deposit. Deposits for students that do not graduate, withdraw or otherwise request a refund remain on file for four years. Those deposits are forfeited to the University’s General Deposit Scholarship Fund, after deducting any amounts owed the University.

**Residence Hall Deposit**

A deposit of $300 and a nonrefundable $50 application fee are required to apply for a room in a residence hall or university apartments. The deposit will be retained as a deposit against damage or late cancellation or to keep the application on file. A reservation may be canceled and the deposit refunded upon request prior to signing a housing contract. Housing contracts must be signed for the next academic year. Any cancellations after May 1st will result in forfeiture of deposit. Additional penalties for later cancellation. The amount of the room deposit and...
the deposit refund schedule are subject to change per university administration approval.

Freshmen classified as U1 with less than 30 hours will be required to have a dining plan if they live on campus.

**Penalties and Late Fees**

**Late Payment Penalty**

There are severe penalties for failure to pay student account balances and installments by their specified due dates. If a payment is delinquent when a semester ends, the student will be blocked and may not receive credit for academic work performed. Students will not be readmitted to the University until all past due balances, including late charges, are paid. A late fee of $25 for A&M students and $50 for HSC students will be assessed for each payment not received on or before it is due. If a student is removed from the rolls of the University or is withdrawn for failure to pay amounts owed the University, a reinstatement fee of $50 for A&M students and $150 for HSC students will be assessed in addition to any other late fees or penalties already incurred and must be paid before the student will be reinstated. Current due dates can be found online at the Student Business Services website.

**Late Registration Fees**

Students who register on or after the first day of classes are assessed a late registration fee of $100 for A&M students and $200 for HSC students. Students who register after the official census date (12th class day for fall or spring and 4th class day for summer) are assessed a late registration fee of $200 for A&M students and $250 for HSC students. Students who add classes after the official census date are assessed a late add fee of $50 for A&M students and $100 for HSC students. Note: Penalties, late registration and late add fees also apply to students who are required to reenroll because their registrations were canceled for nonpayment. Registrations are subject to cancellation and/or financial penalties if sufficient payment is not received before 5:00 p.m. on the semester due date.

**Use of Collection Agencies and Credit Bureau**

If amounts become past due, the University reserves the right to report the account to the Credit Bureau. This will also initiate internal collection efforts and could cause the University to employ an outside collection agency to recover the debt. If any collection efforts must be made, the student will be required to reimburse the University for the fees of any collection agency, which may be based on a percentage at a maximum of 30% of the debt, and all costs and expenses, including reasonable attorney’s fees the University incurs in such collection efforts.

**Cancelling Registration**

Once students have registered for classes, they must select one course of action from the following to remain in good standing with the University:

- pay all amounts due by the specified due date;
- use the online registration to drop all classes prior to the first day of classes; or
- initiate the withdrawal process online in Howdy to begin the process to withdraw from the University after the first day of classes.

Following this procedure is especially important for students who have been awarded scholarships or financial aid since the aid may automatically pay tuition and fees and cause the registration to be held even though the student has decided not to attend. Failure to request cancellation of an unwanted registration may result in grades of F or I in all courses for the semester. The student will be required to reimburse the University for scholarships and other financial aid applied to his or her account and will be held responsible for paying all fees for the semester, regardless of whether he or she attended classes.

**Cancellation for Nonpayment of Tuition or Fees**

The University reserves the right to cancel registrations not paid by their due date, or the official census date for a semester or summer term, to comply with state laws requiring payment of tuition and fees, to free the classroom spaces for other students, and to ensure the most efficient use of university resources.

**Refunds**

**Fee Adjustments for Courses Dropped**

A student may drop individual courses during the first five days of a fall or spring semester (first four days of a summer term). Students also may drop individual classes with special permission of the dean between the 6th and 12th class days. Full refunds will be given for the individually dropped courses during these periods provided the student remains enrolled in at least one class and has not withdrawn from the university. Refunds will not be issued for classes dropped after the 12th class day. Any credit balance on a student account as a result of dropping courses will not be refunded until after the fifth class day. As of the first day of the semester, students may not drop all of their courses through the drop/add process, but instead must begin the official withdrawal process online through Howdy (https://howdy.tamu.edu) (see Withdrawal from the University below for additional information regarding the withdrawal process). A student may add courses during the first five days of a fall or spring semester.

**Adjustments for Withdrawal—Tuition and Fees**

Tuition and fee adjustments shall be made to students officially withdrawing from the University for charges listed below according to the following refund schedule: Tuition and Required Fees, Residence Hall Rent, and Meal Plans.

### Fall and Spring Semester and 10-Week Summer Semester

<table>
<thead>
<tr>
<th>Timing</th>
<th>Percentage</th>
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<tbody>
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</tr>
<tr>
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<td>80%</td>
</tr>
<tr>
<td>During the second five class days</td>
<td>70%</td>
</tr>
<tr>
<td>During the third five class days</td>
<td>50%</td>
</tr>
<tr>
<td>During the fourth five class days</td>
<td>25%</td>
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<tr>
<td>After the fourth five class days</td>
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### Summer Term of More Than 5 Weeks But Less Than 10 Weeks

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<td>By 5 p.m. on the last business day before the first day of class</td>
<td>100%</td>
</tr>
<tr>
<td>During the first, second or third class day</td>
<td>80%</td>
</tr>
<tr>
<td>During the fourth, fifth or sixth class</td>
<td>50%</td>
</tr>
<tr>
<td>Seventh day of class and thereafter</td>
<td>None</td>
</tr>
</tbody>
</table>

### Athletic Refunds

Refunds are not allowed for individual games or games missed. A prorated refund is permitted until the option is used to pick up a ticket for any one game. Once a ticket option has been used, prorated refunds will be given only in the event of withdrawal from the University. For information on refunds, contact the Athletic Business Office at (979) 846-8892.

### Reductions in Rates for Late Entry to the University

No reduction will be made in the charge of room rent and board in case of entrance within 10 days after the opening of a semester or summer term, nor will a refund be made in case of withdrawal during the last 10 days of a semester or summer term, or the last days for which payment is made.

### Refund Delivery

Texas A&M and Heartland ECSI have joined forces to deliver financial aid and other refunds to students faster through the University’s refund delivery process. You will receive information from Heartland ECSI and the University at your new student conference and in your official University email account, which will explain the process for signing up for direct deposit of refunds.

### Yearbook Refunds

Yearbook charges are refundable in full during the semester in which payment is made. Thereafter, no refunds will be made on orders canceled in subsequent semesters. Yearbooks must be picked up during the academic year in which they are published. Students who will not be on campus when the yearbooks are published must pay a mailing and handling fee. Yearbooks will not be held, nor will they be mailed, without payment of the mailing and handling fee. Refunds will not be made on books not picked up within one semester of the publication date. Refunds will not be made before 21 days from the date of payment. Refund policies contained herein reflect policies in effect at the time of publication and are subject to change.

### Dining Plan Refunds and Add/Change/Drop Policies

Texas A&M University Dining’s dining plans and options listed are based on information available at time of printing and are subject to change. University Dining follows the University’s refund schedule for Tuition and Fee Adjustments. Refunds are given on the percentage basis listed for students dropping fee options or officially withdrawing from the University.

Students may purchase a dining plan, change to a larger plan or add on to a plan during registration for classes or at any time through University Dining. Dining Plans and additions to the plans may be charged to the student account through the ninth week of school. Any purchases after that point will require a credit card payment. Changes from a higher dining plan to a smaller dining plan or requests to cancel/drop are permitted only through the fourth week of classes. The appropriate fee is to be paid to the Office of Student Business Services.

Dining plans are valid for one semester starting with the first day of campus move-in (as designated by the Department of Residence Life) and end after the last final exam day. Check with Dining for posted dates for dining plan access. Location hours may vary during class breaks and meal availability may exclude official University holidays.

Following University policy, no one is authorized to use or borrow a student’s identification card (Aggie Card), therefore, dining plans are not transferable between students. The Aggie Card must be presented to Dining cashiers for dining plan participation. If an Aggie Card becomes lost, report it immediately by calling (979) 845-4661 or go to http://myaggiecard.tamu.edu to deactivate the card.

For questions and assistance, please email dining@tamu.edu (include name, UIN and instructions if dining plan related) or contact our office at (979) 845-0152. Additional information on University Dining and dining plans can be found on our website (https://new.dineoncampus.com/tamu) or in this catalog under Campus Dining.

### Residence Hall Rent/Deposit Refund

If a student withdraws, moves off campus or in any other way terminates the housing contract, a refund of residence hall rent may be made according to the stipulations in the housing contract. If a student cancels the academic year housing contract during the contract period, the $300 deposit is subject to forfeiture. Any cancellation made 7 days after the student has been assigned, will be subject to 25% of the fall semester’s room rent. Any cancellation for the spring semester not outlined as an exception in the housing contract will be subject to an additional charge equal to 50% of the spring semester’s room rent. Exceptions may be made for students who cancel their contract for the following reasons: co-op or student teaching assignment, academic restriction, graduation and medical withdrawal.

### Withdrawal from the University

Once the University has accepted payment for tuition and fees, a student is considered officially enrolled unless otherwise restricted from enrolling. Stopping payment on a check for fees or allowing the check to be returned unpaid by the bank for any reason does not constitute official withdrawal.

Before classes begin, you may go online to Howdy (http://howdy.tamu.edu) and cancel your courses and options for the semester.

After classes begin, you must go through the official withdrawal process in order to cancel your registration for the semester. In Howdy (http://howdy.tamu.edu), go to the Student Withdrawal channel on the My Record tab to begin the online withdrawal process. Failure to complete the withdrawal process will result in forfeiture of any tuition and fee adjustments, and course work may be recorded as incomplete or failed.

Failure to follow procedures for withdrawing from the University may result in financial penalties and delays with future enrollment in the University. Once a student registers, he or she is responsible for the total fees assessed regardless of whether the installment option is used. Refund percentages are applied to total fees assessed and not the
amount paid. This means that students who withdraw before paying all installments may, in the event of withdrawal, still owe the University.

**International students** must visit with an advisor in the International Student Services Office before withdrawing to determine if doing so will affect visa status.

**Student athletes** should visit with an academic advisor in the Department of Athletics before initiating the withdrawal process.

**Recipients of financial assistance** should visit with a Scholarships & Financial Aid advisor before withdrawing. Students receiving funds awarded by Scholarships & Financial Aid should be aware of policies (http://financialaid.tamu.edu/Undergraduate/Maintaining-Eligibility/#2-Withdrawals) regarding withdrawal from the University. Federal regulations require a return calculation for all students who receive Title IV student assistance at a post-secondary institution of higher education and withdraw during a payment period (semester). The length of time during which a return must be calculated is up to 60 percent of the payment period. Students withdrawing prior to 60 percent of the payment period may be required to return disbursed funds not earned. Additionally, students who do not successfully complete courses for the semester may be considered unofficially withdrawn and may be subject to a return calculation or all disbursed funds being returned if attendance cannot be documented. Eligibility for state and institutional funds may also be impacted by withdrawing from the University. Drops and withdrawals are considered unsuccessfully completed coursework when determining Satisfactory Academic Progress (http://financialaid.tamu.edu/Undergraduate/Maintaining-Eligibility) (SAP) and will impact completion rate.

## Allocating Returned Title IV (Federal Aid)

Funds that are returned to the federal government due to student withdrawal are used to reduce the outstanding balances in individual federal programs.

Financial aid returned (by the University and/or the student or parent) must be allocated in the following order:

1. Unsubsidized Federal Direct Loan
2. Subsidized Federal Direct Loan
3. Federal Perkins Loan
4. Direct Graduate Plus (Student) Loan
5. Federal Direct PLUS (Parent) Loan
6. Federal Pell Grant
7. Federal Supplemental Educational Opportunity Grant (FSEOG)
8. TEACH Grant
9. Other federal loan or grant assistance
10. Other state or institutional financial aid programs

Additionally, students who do not successfully complete courses for the semester may be considered unofficially withdrawn and may be subject to a return calculation if attendance cannot be documented.

### Unclaimed Refunds

According to federal law, the university is required to return Title IV funds that have not been claimed (i.e., refund check that has not been cashed) within 240 days of issue. These funds will be returned to the appropriate federal financial aid program.

## Rebates

### Tuition Rebates After Graduation

Certain undergraduate students who attempt no more than three hours in excess of the minimum number of semester credit hours required to complete the degree under the catalog under which they were graduated may be entitled to a $1,000 tuition rebate after graduation. Several conditions apply and students must meet all of the specified criteria. If you wish to try and qualify for this program, please see the Office of the Registrar (http://registrar.tamu.edu) website for a complete set of student and institutional responsibilities and other criteria.

## Financial Assistance and Scholarships

The mission of Scholarships & Financial Aid is to provide students with information and financial resources to attend Texas A&M University along with support programs that promote higher education and developmental opportunities. As a part of this commitment, we strive to provide financial solutions to students at all income levels and with varying academic, merit, and leadership qualifications.

The need-based financial assistance program is designed for students who have a demonstrated financial need, as defined by the Free Application for Federal Student Aid (FAFSA) or other applicable application, in order to assist students in paying college expenses. All financial aid is contingent upon student enrollment and making Satisfactory Academic Progress (SAP), as defined by Scholarships & Financial Aid or the specific aid program.

Financial aid is available in two forms: Gift Aid and Self-help.

### Gift Aid

- Grants (Federal, State, Institutional)
- Scholarships
- Federal Pell Grant
- Federal Supplemental Educational Opportunity Grant (FSEOG)
- Federal Direct PLUS (Parent) Loan
- Direct Graduate Plus (Student) Loan
- Federal Perkins Loan
- Other federal loan or grant assistance
- Other state or institutional financial aid programs

### Self-Help

- Loans (Federal, State, Institutional, Alternative)
- Student Employment (Work Study, Part-time Employment, Internships, Assistantships)

### Non-resident Tuition Waivers

Texas A&M University’s packaging philosophy for need-based financial aid is to provide the greatest amount of gift aid to those students with the highest demonstrated need and to keep loan liability to a minimum. Financial aid is awarded on a first-come, first-served basis with a priority date prior to the fall semester for which the student is seeking aid.

To apply for financial assistance, a student must submit a Free Application for Federal Student Aid (FAFSA). The FAFSA becomes available on October 1st each year for the next academic year. Students are encouraged to submit their FAFSA online at https://fafsa.gov as soon as possible. Students who do not meet the citizenship eligibility requirements to complete the FAFSA may be eligible to submit the Texas Application for State Financial Aid (TASFA) or the International Student Financial Aid Application (ISFAA). Only students who have been accepted for enrollment, have a FAFSA or other financial aid application on file, and have submitted all requested documentation to Scholarships & Financial Aid will be sent a financial aid offer. Award offers for incoming students beginning in the Fall semester are made early in the preceding Spring semester. Award offers for incoming students beginning in the Spring semester are made late in the preceding Fall semester. Award
offers to continuing students for the upcoming academic year are made after Spring semester grades have been submitted. Summer financial assistance is offered to students with a FAFSA on file who enroll at least half-time in summer coursework at Texas A&M.

Financial aid offers are made based on the assumption that students will enroll full-time in the fall and spring semesters. Cost of attendance and awards will be adjusted for students who are enrolled less than full-time at Texas A&M University or through the Texas A&M-Blinn TEAM Programs. Students may only receive federal financial aid for eligible courses that count towards the program of study. State and Institutional Aid are not subject to the same regulatory restrictions. However, the cost of attendance for students will be reduced for courses that are not counting to the program of study, which can result in a lower amount of state and institutional aid a student could receive.

Student inquiries may be directed to:

Scholarships & Financial Aid
Texas A&M University
P. O. Box 30016
College Station, TX 77842-3016
(979) 845-3236
financialaid@tamu.edu
http://financialaid.tamu.edu
FAFSA School Code 003632

Please visit our website (http://financialaid.tamu.edu) for the most current information on financial aid applications, programs, and any associated deadlines.

Grants
The Federal Pell Grant is available to undergraduate students who have not received a baccalaureate degree and who have demonstrated financial need as determined by the FAFSA. The Federal Pell Grant provides a foundation of financial assistance to which aid from other sources may be added.

The Federal Supplemental Educational Opportunity Grant (FSEOG), and the Texas Public Education Grant (TPEG) are available to students, provided the results of their financial aid application show evidence of financial need and funds are available. These funds are awarded on a first-come, first-served basis. The Towards EXcellence, Access and Success (TEXAS) grant is available to eligible Texas residents who have requisite levels of financial need according to the FAHSA and have met the remaining program criteria (http://financialaid.tamu.edu/Undergraduate/Types-of-Aid/#0-TexasGrant); it is also subject to funds availability and eligibility guidelines as defined by the Texas Higher Education Coordinating Board. Additionally, Texas A&M University provides institutional grant aid to eligible students to assist with educational expenses. Student grants are subject to fund availability and may be single-year or multi-year awards.

Student Part-Time Employment
The Student Employment Office in Scholarships & Financial Aid coordinates student part-time employment, both off- and on-campus in the Bryan/College Station area. Students may visit the online job database. Work Study, assistantships and other part-time positions are posted. Students secure their own employment through job leads provided by Scholarships & Financial Aid or through their own initiative. Employment advising is available to students who have not had previous job seeking experience.

On-campus student employees are paid minimum wage or higher and are paid bi-weekly along with regular University employees. University student employees are not eligible for paid holidays, retirement, vacation, nor sick leave.

Professional development workshops are available for student employees and supervisors of student employees. These free workshops include topics ranging from communication skills to preventing sexual harassment in the workplace and from customer service to workplace etiquette. For more information or to register, please visit the Jobs for Aggies website (http://jobsforaggies.tamu.edu) or call (979) 845-0686.

The Federal/Texas College Work Study Programs
Federal and state programs provide part-time employment for U.S. citizens, permanent residents and eligible non-citizens, within fund limitations, who have an established financial need and desire on-campus employment.

To qualify for the Federal/Texas College Work Study Programs, a student must have submitted a financial aid application, have financial need, be eligible to work in the United States, be enrolled at least half-time or accepted for enrollment and be making Satisfactory Academic Progress if enrolled.

The Community Service Program allows students who qualify for the Federal Work Study Program to work part-time with participating local non-profit, governmental and community-based organizations. This program is designed to improve the quality of life for community residents, particularly low-income individuals, or to solve problems related to community needs.

The Texas A&M University Reads and Counts program is a partner of the national Every Student Succeeds Act (established initially as a part of the No Child Left Behind initiative). It is based on the philosophy that children are our nation’s greatest asset. It calls all Americans to support teachers and help ensure that every child can read well by the end of the third grade. Eligible and dedicated college students are called to serve as reading and math tutors, as well as mentors and role models for area elementary and middle school students.

All Work Study students are paid minimum wage or higher, work an average of 20 hours per week, and are not eligible for paid holidays, retirement, vacation, nor sick leave. For more information on Federal/Texas College Work Study, the Community Service Program, or Texas A&M University Reads and Counts, visit the Student Employment Office on the second floor of the Pavilion or the Jobs for Aggies website (http://jobsforaggies.tamu.edu).

Loan Programs
The Federal Direct Loan Programs are available to students who have submitted a FAFSA. Students will be notified of their eligibility for the Direct Loan program(s) through a financial aid offer.

Students and parents seeking the Parent Loan for Undergraduate Students (PLUS) may obtain information from the financial aid website (http://financialaid.tamu.edu). This program requires the FAFSA to be on file with Scholarships & Financial Aid.

Short-term loans are available to provide assistance to students who experience temporary financial difficulties with educationally related expenses. Funding for this program is provided by The Association of Former Students, the Class of 1926 and other University resources. This program is not intended to provide long-term assistance or to
replace other assistance available through Scholarships & Financial Aid. Students must be degree-seeking and enrolled at least half-time to be eligible for short-term loans.

The Emergency Tuition and Required Fees loan program is available to help students pay their Texas A&M University tuition and required fees. The loan is applied directly to the student’s tuition and fee account.

Please refer to our website (http://financialaid.tamu.edu) for detailed information on all of the aforementioned programs and more.

The Money Education (ME) Center
The Money Education (ME) Center provides the following free resources to all students in order to help them make wise personal finance decisions and to lay a foundation for financial success throughout life.

- Money Wise Aggie Workshops – presentations covering budgeting, credit cards and credit scores, saving and investing, student loans, and more. Scheduled presentations occur on-campus each semester and are provided in classrooms and to student organizations upon request.
- Money Wise Aggie Financial Foundations Series – a series of presentations covering the most critical personal finance topics
- Advising – one-on-one personal financial counseling
- moneywise.tamu.edu – offers personal finance content and videos
- SALT (saltmoney.tamu.edu) – provides scholarship, student loan, and personal finance information and tools

To learn more about these free resources, visit money.tamu.edu or contact money@tamu.edu.

Scholarships

College/Departmental Level Scholarships
A number of colleges and departments at the University award scholarships on a merit basis to incoming freshmen interested in particular major fields of study. The value of the awards vary, and the term of scholarships range from one to four years. Selection by each awarding college and department is based upon pre-determined criteria. Completed scholarship applications must be received no later than specified deadlines. Awards are announced mid-spring for the following academic year.

Incoming Freshmen Scholarship Programs
Opportunity Awards are awarded to freshmen based on academic achievement, leadership ability, extracurricular participation, and, in some cases, financial need. To be considered, students must complete and submit the ApplyTexas (http://www.applytexas.org) or Coalition (http://www.coalitionforcollegeaccess.org) freshmen scholarship application no later than December 1 of their senior year of high school. In addition to scholarships offered through the Scholarships & Financial Aid office, many colleges, departments, the Corps of Cadets, and the Texas A&M Foundation utilize the ApplyTexas (http://www.applytexas.org) or Coalition (http://www.coalitionforcollegeaccess.org) freshmen scholarship application.

Achievement Scholarships are available to incoming freshmen who attended and graduated from targeted high schools in the State of Texas. Scholarships include the Academic Achievement Scholarship, President’s Achievement Scholarship, Challenge Scholarship, and Century Scholarship. These high schools are designated as House Bill 400 schools, Engineering E12 schools, Early College High Schools, and Century Scholar Program Schools. Awards are based on academic achievement, leadership ability, and extracurricular participation. To be considered, students must complete and submit the ApplyTexas (http://www.applytexas.org) freshmen scholarship application no later than December 1 of their senior year of high school.

Academic Scholarships are available to incoming freshmen who achieve a minimum 1300 Old SAT composite score (critical reading + math, with respective scores of 600 in each), 1360 New SAT composite score (evidence-based reading and writing score of at least 660 + math scores of at least 620), or 30 ACT composite (English + Math, with scores of at least 27). Scholarships include President’s Endowed Scholarship, Lechner Scholarship, and McFadden Scholarship. Awards are based on academic achievement, leadership ability, and extracurricular participation. To be considered, students must complete and submit the ApplyTexas (http://www.applytexas.org) freshmen scholarship application no later than December 1 of their senior year of high school.

Continuing Student Scholarships
The University Scholarship Application is available to students with at least one semester completed at Texas A&M. Awards range in value from $500 to $1,500 and are available to undergraduate, graduate, and professional students currently enrolled at Texas A&M. Some awards are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted. Awards are made to outstanding students based on a combination of academic achievement, campus/community involvement, campus leadership roles, and, for some scholarships, financial need. In addition to scholarships offered through the Scholarships & Financial Aid office, many colleges, departments, the Corps of Cadets, and the Texas A&M Foundation use the University Scholarship Application for award consideration. Students are encouraged to complete the application beginning in October via the scholarships website (https://scholarships.tamu.edu). The deadline for submitting applications is February 1, prior to the academic year for which the student will be awarded.

Transfer Student Scholarships
Aggie Transfer Student scholarships are designed to recognize outstanding students who will be transferring to Texas A&M University. Scholarships are awarded based on a combination of academic achievement, extracurricular activities, campus involvement at the student’s current institution, leadership, major and, in some instances, financial need. These award amounts can range from $500 to $2,000 and the application is available to students through the ApplyTexas (http://www.applytexas.org) or Coalition (http://www.coalitionforcollegeaccess.org) application. In addition to scholarships offered through the Scholarships & Financial Aid office, many colleges, departments, the Corps of Cadets, and the Texas A&M Foundation use the ApplyTexas transfer scholarship application for award consideration. For more details, visit our website (https://scholarships.tamu.edu).

Scholarship Recipients and Non-Resident Tuition Waivers
The Competitive Scholarship waiver, authorized under Texas Education Code 54.213a, is an optional waiver that institutions can implement. An eligible non-resident student who holds a competitive academic scholarship of a specified minimum dollar amount for the academic year or summer for which the student is enrolled may be eligible to pay the fees and charges required of Texas residents without regard to the length of time the student has resided in Texas. The student must have competed with other students, including Texas residents, for the scholarship and the scholarship must be awarded by a Texas A&M University college or departmental scholarship committee or university
representative. An outside donor may be consulted for input by the college or departmental unit, however, outside donor(s) may not make the final selection of the student recipient for a scholarship.

Effective Fall 2017, undergraduate students must be awarded and maintain competitive scholarships of at least $4,000 per academic year in order to qualify for this waiver. All graduate students, all professional students, and current undergraduate students with existing and continuing scholarship awards, may continue to receive this waiver at the previous $1,000 threshold.

More information is available at http://scholarships.tamu.edu/Non-Resident-Tuition-Waiver

For additional information on scholarships, please visit https://scholarships.tamu.edu/ or email scholarships@tamu.edu.
UNIVERSITY POLICIES

University Statement for Individuals with Disabilities

Texas A&M University (TAMU) does not discriminate on the basis of an individual’s disability and complies with Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) as amended.

Students are protected from nondiscrimination regarding access to and participation in TAMU’s programs and activities. TAMU provides academic adjustments and auxiliary aides to accommodate needs of students with disabilities, as defined under the law, who are otherwise qualified to meet the institution’s academic requirements.

Students with disabilities who would like to request accommodations may contact the following based on your campus:

- TAMU College Station and Texas A&M University Health Science Center’s (TAMUHSC) College of Nursing and School of Public Health should contact Disability Services (979) 845-1637 or disability@tamu.edu.
- TAMUHSC College of Dentistry should contact the Office of Academic Affairs (214) 828-8207.
- TAMU Galveston (TAMUG) campus should contact Counseling and Career Services (409) 740-4736 or studentservices@tamug.edu.

Students with a disability who believe they have experienced discrimination may contact the following based on your campus:

- TAMU College Station should contact the ADA Coordinator at (979) 845-8116 or ADA.Coordinator@tamu.edu.
- TAMUHSC should contact the ADA Coordinator at (979) 436-9207 or ADA.Coordinator@tamhsc.edu.
- TAMUG should contact the ADA Coordinator at (409) 740-4503 or boyerj@tamug.edu.

For more information about disability accommodations, see TAMU Student Rule 46, Disability Accommodations in Academic Programs (http://student-rules.tamu.edu/rule46) or TAMUG Student Rule 46, Disability Accommodations in Academic Programs (http://www.tamug.edu/studentrules/Student_Grievance_Procedures/46_Disability_Accommodations.html).

University Statement on Harassment and Discrimination

Texas A&M University provides equal opportunity to all employees, students, applicants for employment or admission, and the public regardless of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity. Texas A&M University will promptly investigate all complaints of discrimination, sexual harassment, and/or related retaliation in accordance with applicable federal and state laws. Students who have questions or believe they have experienced illegal discrimination, sexual harassment, sexual violence, and/or related retaliation are encouraged to contact:

- TAMU College Station contacts - Notice of Nondiscrimination and Abuse (https://www.tamhsc.edu/payroll-hr/docs/notice-nondiscrimination-and-abuse.pdf)
- TAMU Galveston Campus contacts - Notice of Nondiscrimination and Abuse (http://www.tamug.edu/hrd/LinksAndForms/TAMUG_Notice_of_Nondiscrimination_and_Abuse.pdf)

INTERNATIONAL OPPORTUNITIES FOR STUDENTS

Student Options Abroad
Study Abroad Programs Office
http://studyabroad.tamu.edu

Texas A&M University is committed to providing access to high impact international opportunities for all students. The ability to engage successfully across cultures and the development of international leadership skills are crucial for success as graduates enter the work force and commit to lifelong learning.

The Study Abroad Programs Office provides access for all Texas A&M students to a broad range of high impact international experiences. Last year, over 5,300 students participated in academic, volunteer, service learning and research opportunities in over 100 different countries. The Study Abroad Programs Office also contributes to the development of on-campus experiences that foster cultural awareness.

Conducting Research Abroad
Texas A&M University faculty engage in research in many foreign countries. Students who join faculty on research programs overseas, or who develop independent research opportunities, should register with the Study Abroad Programs Office to ensure emergency assistance as needed while abroad. Several other research options include the following:

- Fellows Program – MSC L.T. Jordan Institute for International Awareness (http://ltjordan.tamu.edu/fellows)
- Undergraduate Research (http://ugr.tamu.edu)
- Scowcroft Institute of International Affairs (http://bush.tamu.edu/scowcroft)

Internships/Work Abroad Options
Students have a variety of options for credit or non-credit work or internships abroad. In all such cases, students should register their work abroad experiences with the Study Abroad Programs Office to ensure emergency assistance as needed while abroad.

- Internship and Living Abroad Programs – MSC L.T. Jordan Institute for International Awareness (http://ltjordan.tamu.edu/ilap)
- Public Policy Internship Program (http://ppip.tamu.edu)
- Texas A&M Sponsored Internships (http://studyabroad.tamu.edu/Program-Types/Research-Internship-Volunteer-Conference)

University Locations Abroad
Many Texas A&M partner organizations offer international opportunities to students. Students can check the Study Abroad Programs Office search engine to locate such experiences or contact their academic departments about programs and locations they recommend. In addition, Texas A&M has a research and education center in Costa Rica.

The Soltis Center for Research and Education in Costa Rica
http://soltiscentercostarica.tamu.edu

The Soltis Center for Research and Education in north-central Costa Rica was established in January 2009 to support research, education and outreach in Costa Rica and throughout Central America. The Center is located in San Juan de San Isidro de Peñas Blancas, about three hours northwest of San Jose. The modern facilities of the Center include dorms, a cafeteria, wet and dry labs, classrooms, a videoconference room and multiple use areas. The Center provides students and faculty with access to more than 250 acres of primary and second growth forests with an experimental watershed complete with a meteorological station, a canopy tower and weir dam. The Center is adjacent to more than 50,000 hectares of protected forest in the Children's Eternal Rainforest and the Monteverde Conservation Area. The Zona Protectora Arenal-Monteverde extends to the Center through a forest corridor that descends in elevation from 1,800 meters at Monteverde to 450 meters above sea level at the Center. This natural reserve has four major tropical life zones and includes more than 3,000 species of vascular plants and more than 400 species of resident and migratory birds. At the regional level, the Center is located in the heart of the Peñas Blancas River Watershed, which extends over 40,000 hectares that transition from rainforest in the highlands to pastures and agricultural crops below the Center. The unique physical and cultural setting of the center provides students and faculty with research and educational opportunities in tropical ecology, civil engineering, ecosystem sciences, geosciences, public and rural health and agricultural economics.

On Campus Engagement in International Opportunities
Students don’t have to go abroad to take advantage of international opportunities offered by Texas A&M. Students who remain on campus are encouraged to participate in many options available including the following:

- Academic certificates and minors with an international focus (http://studyabroad.tamu.edu)
- Center for International Business Studies (http://cibs.tamu.edu)
- Confucius Institute at Texas A&M University (http://confucius.tamu.edu)
- Corps Global Leadership Initiatives (http://corps.tamu.edu/global)
- MSC L.T. Jordan Institute for International Awareness (http://ltjordan.tamu.edu)
- Norman Borlaug Institute for International Agriculture (http://borlaug.tamu.edu)
- SCONA (http://scona.tamu.edu)
- Scowcroft Institute of International Affairs (http://bush.tamu.edu/scowcroft)
- Student Organizations (http://studentactivities.tamu.edu/app/organization)
  - (To find internationally focused student organizations, please visit http://studentactivities.tamu.edu/app/search/index and search international.)

Students should consult their department and college advisers for additional opportunities to engage in global education on or off campus.
HONORS AND UNDERGRADUATE RESEARCH

LAUNCH promotes student success by providing high-impact educational experiences and challenges motivated students in all academic disciplines to pursue an enriched, intellectually-stimulating curriculum. LAUNCH joins the university community in making Texas A&M a welcoming environment for all individuals. We are committed to helping our students understand the cultures that set us apart and appreciate the values that bring us together.

Undergraduate Research

LAUNCH: Undergraduate Research promotes, coordinates, creates, and assesses undergraduate programs involving creative scholarship, inquiry, and research in all academic disciplines at Texas A&M. As a recognized “high impact practice,” undergraduate research experiences increase undergraduate student learning and success, not only while students are at Texas A&M, but long after graduation.

In terms of professional and intellectual development, being involved in undergraduate research allows students to participate in a scholarly community of students with common interests, to learn more about their future professional field, and to develop a close working relationship with acclaimed faculty. Research experiences make students more competitive for scholarships, internships, jobs, international opportunities, and admission to top graduate and professional programs. Perhaps most importantly, engaging in undergraduate research allows students to experience the excitement of working collaboratively to create new knowledge, solve cutting-edge problems, work collaboratively, and communicate more effectively—life skills that are increasingly valued in our world.

Campus-wide programs coordinated by LAUNCH: Undergraduate Research include the Undergraduate Research Scholars program, the Undergraduate Research Ambassador, and the publication of Explorations: the Texas A&M Undergraduate Journal. The office offers workshops for undergraduate students on getting started in research, finding summer research opportunities, developing research presentations, and organizing thesis writing, as well as workshops for faculty and graduate students on mentoring undergraduate researchers.

LAUNCH: Undergraduate Research also works with groups across campus to promote and facilitate activities that support undergraduate research opportunities, such as Summer Undergraduate Research Experiences, National Science Foundation Research Experiences for Undergraduates (REU) programs, and the LAUNCH-Sigma Xi Research Expo. Lastly, the office provides assistance for developing externally-funded proposals and implementation of funded projects that have undergraduate research involvement, such as National Science Foundation REU, Beckman Scholars, and Howard Hughes Medical Institute Education grants.

Undergraduate Research Scholars Program

Any junior or senior student with a cumulative Texas A&M GPR of 3.0 or above may apply to the Undergraduate Research Scholars (http://ugr.tamu.edu/UGR/UGRS) program. Groups of at least two students collaborating as a team on a single project may also apply. The Research Scholars program requires independent research during the Fall and Spring semesters supervised by a faculty advisor that culminates in a scholarly product. The scholarly product may be a research thesis, an accepted article in a professional journal, an exhibit, a performance, or other product as determined by the faculty advisor in collaboration with the LAUNCH: Undergraduate Research Office. Participants are selected for this program based on the quality of their project proposals and their academic records.

Explorations: the Texas A&M Undergraduate Journal

Explorations is an interdisciplinary, student-led journal guided by faculty and administrators that selects and publishes student-authored research, scholarly, and creative pieces of general interest in any area. Explorations is composed of an Executive Board, Editorial Board, as well as a Marketing and Design Team made of students that work to accomplish the many facets of editing, publishing, and marketing the journal while representing departmental diversity, critical thought, and creativity.

The call for submissions begins late in the fall semester and extends into early spring. Articles are submitted in a two-stage process: first, synopses of articles are reviewed by faculty-student teams; second, full-length articles are evaluated in another round of peer review. Creative works are reviewed by faculty-student teams in a one-stage process. All authors of accepted pieces are paired with student board members who provide editorial assistance and formatting guidance. Additionally, the Explorations Board extends a call for cover art submissions based on one of the accepted pieces for each volume. Every fall Explorations hosts a journal release event to recognize all who were involved in the making of the latest volume.

Acceptance to the journal is highly competitive—less than 20% of submitted synopses result in published articles. Recently published articles cover a wide range of academic fields: music, creative poetry, forensics, cancer biology, astrophysics, nanomedicine, computer algorithms, business, geosciences, sociology, aerospace engineering, and cultural anthropology. To review recent volumes and to find upcoming submission deadlines, visit explorations.tamu.edu.

Undergraduate Research Ambassadors

Undergraduate Research Ambassadors represent LAUNCH: Undergraduate Research at research, recruiting, and outreach events. Juniors or seniors with an extensive background in research, a GPR of 3.0 or higher, outstanding oral communication skills, and the ability to describe research to a general audience may apply to the program. A cohort of about a dozen Ambassadors are chosen to join existing Ambassadors from multiple disciplines each year. They are trained in presentation and leadership skills and then participate in a variety of activities including meeting with highly-placed members of the University Administration, distinguished faculty, outstanding alumni, prospective students, and parents.

Workshops and Events

LAUNCH: Undergraduate Research offers informational workshops on undergraduate research for undergraduate students, graduate students, and faculty. Additionally, we coordinate numerous public events that celebrate and promote undergraduate research, providing venues for students to present their research projects, for faculty to recruit new student researchers, and for recognition of the research efforts of both students and faculty. Workshops and events are publicized through emails, newsletters, and the LAUNCH (http://ugr.tamu.edu) website.
Grant, Proposal, and Project Assistance

LAUNCH: Undergraduate Research provides a wide variety of support services for undergraduate research programs, proposal development, and implementation. Please contact the office directly for more information.

Other Capstones

LAUNCH: Capstones offers one year Capstone experiences to any Junior or Senior with a cumulative Texas A&M GPR of 3.0 or above. A listing of capstone options can be found at http://tx.ag/Capstones.

The Undergraduate Teacher Scholars program allows students to collaborate closely with a Texas A&M University faculty member to create a one-credit hour seminar or to improve an existing course in collaboration with a faculty expert. The Teacher Scholar will have the opportunity to research, design, and arrange the content of the seminar. The Teacher Scholar will be responsible for the presentation of class material under the supervision of the Texas A&M University supporting faculty member.

The Undergraduate Service Scholars program pairs students with community leaders to develop and carry out projects that benefit the greater community. The Undergraduate Service Scholars capstone allows the student to draw upon their undergraduate education to plan, coordinate, and execute a project aimed at improving the community while learning about issues that affect that community.

The Undergraduate Leadership Scholars program enables student leaders in various organizations to refine their leadership skills and methodologies. In collaboration with their faculty advisor, Undergraduate Leadership Scholars plan and implement improvements to their organization's programming and impact on campus or in the community.

All capstones require a proposal and timeline, two semesters engaging with the project, supervision by a faculty member or similar expert, a public presentation, regular reflection, and a scholarly project appropriate for the field. Students are selected for participation in these programs based on the quality of their proposals, their academic record and the recommendation of their faculty or community advisor.

Admission to the University Honors Program

Honors Fellows is the university-level Honors distinction offered by the University Honors Program. Students are admitted to the Honors Fellows curriculum on a competitive basis. Incoming freshmen apply as part of their application for admission to the university. Continuing students may apply each spring for entry in the fall prior to completing 60 credit hours at Texas A&M.

Applications are evaluated on the basis of the student’s record of academic achievement and demonstrated potential for creativity, intellectual ability, imagination, curiosity, willingness to try new things and self-awareness. Once admitted to the Honors Fellows curriculum, students are designated as “Honors Students” and may then access specific privileges and resources, including additional advising, priority registration, contracting non-honors courses for Honors credit, Honors Independent Study and enrolling in graduate-level courses for undergraduate Honors credit. Honors Students also receive priority for the Honors Housing Community and advising for competitive national fellowships.

Freshmen admitted to the University Honors Program are required to live in the Honors Housing Community and participate in the Honors first year experience course. To remain in the program, all students (freshman and continuing students) must make progress toward the Honors Fellows distinction and meet minimum co-curricular participation requirements. See the section on Maintaining Honors Status (p. 105).

Honors Fellows Curriculum

To receive the Honors Fellows distinction at graduation, Honors Students must:

- Earn a total of 30 Honors points. Each credit hour of Honors coursework equals 1 point. 21 points must come from Honors courses distributed as follows:
  - Depth: 12 hours in upper-division (300/400-level) courses or graduate courses taken for undergraduate credit
  - Breadth: 9 hours in the Core Curriculum, as specified in the student’s catalog
  - Additional honors points to bring the total to 30 points

- Maintain 3.25 GPR in Honors coursework and 3.5 GPR overall (http://registrar.tamu.edu/Transcripts-Grades/How-to-Calculate-GPA).
- Practical Application: Complete an Honors Capstone experience (http://honors.tamu.edu/Capstones).

The University Honors Program works with academic departments across the university to ensure that appropriate Honors courses are offered. Honors courses have limited enrollment and encourage participatory learning. In Honors classrooms, students work closely with many of the University’s most acclaimed faculty. Material in Honors courses is intended to provide increased complexity, not simply more work or greater difficulty. Small class size (usually not more than 25 students) also allows Honors courses to undertake activities and utilize facilities not readily available to undergraduate students. Honors classes may be special sections of regularly offered courses or courses developed specifically for Honors Students. Students are encouraged to visit regularly with University Honors Program advisors to ensure that their course selection meets both degree and Honors curriculum requirements.

To complete Honors Fellows curriculum requirements, Honors Students must complete a capstone experience. The requirement may be met by engaging in an academic research project in the Undergraduate Research Scholars Program, by preparing and teaching a seminar or adding enriching material to an existing course as part of the Undergraduate Teacher Scholars Program, by undertaking a community service project as a participant in the Undergraduate Service Scholars Program, by developing an enhancement project for a student organization through the Undergraduate Leadership Scholars Program, or by completing a capstone project designated by their home department. Students should consult with a University Honors Program advisor in the planning stages to seek approval for their capstone experience.

Honors Students are afforded several avenues to earn Honors credit in addition to regularly offered Honors courses. Honors Students may contract for Honors credit, engage in Honors independent study or take graduate courses that count toward undergraduate degree requirements. Honors Students should consult with University Honors Program advisors about these opportunities.

Honors Students with unique intellectual interests and specific educational goals may also “major” in Honors by pursuing the innovative
University Studies – Honors (USHN) degree. Students may combine a range of related academic areas into a coherent degree plan by designating an “area of concentration” in combination with two established minor fields of study. The formulation of the degree plan requires students to conceptually link their course selection to a specific “problem” that will be addressed in a capstone thesis.

Maintaining Honors Status

To remain in the Honors Fellows curriculum, Honors Students must:

1. Maintain a 3.5 cumulative GPR,
2. Maintain a 3.25 GPR in honors coursework,
3. Make progress toward curriculum requirements by taking at least 6 Honors credits per year,
4. Fulfill annual co-curricular participation requirements,
   a. Freshmen: Live in Honors Freshman Housing (or obtain a waiver) and participate in the Learning Community Course, and
   b. Continuing Students: Participate in at least two Honors Student Council events each semester, with at least one designated as academic/intellectual.
   c. All: Prepare or update an ePortfolio on an annual basis.

Honors Students who fail to meet any of these requirements will be given a semester of probation to correct any deficiencies. Honors Students who fail to meet requirements after a semester of probation will be dismissed from the program.

University Scholars

The University Scholars program identifies students who embody academic leadership and enhances the personal, professional and intellectual development of these students.

University Scholars receive a scholarship stipend and participate in a number of development activities, including University Scholar Exploration Series, which are intimate discussion-based seminars offered on a wide variety of topics. Additionally, University Scholars serve as ambassadors for LAUNCH at Texas A&M University, representing the office at outreach events and in publicity materials.

Each spring semester, eligible freshmen are invited to apply for the University Scholar program. The application process involves an extensive written application and, for the approximately 40 students selected as semi-finalists, an in-depth interview. In the end, approximately 10 students are invited to join the University Scholar program.

Freshmen who meet the eligibility criteria for the program will be contacted via their official Texas A&M University email accounts at the start of the Spring semester. Students with questions about eligibility should contact LAUNCH.

Honors Student Services

Honors students have access to numerous special services and programs. Throughout the academic year, LAUNCH: Honors coordinates recreational and community-building events, lectures and workshops. Honors students are invited to engage in leadership opportunities and contribute to the development of the University Honors Program through the Honors Student Council, the University Scholars program, and as members of the Honors Housing Community.

Honors students receive supplemental advising to help them identify ways to enrich their college experience and complete the requirements for the prestigious Honors Fellows distinction. Throughout their time in the University Honors Program, students are encouraged to take on challenging and enriching experiences such as undergraduate research, study abroad, service learning, capstone experiences, and application to nationally-competitive scholarships and fellowships. This program is uniquely designed to make Honors students good candidates for opportunities coordinated through LAUNCH: National Fellowships. These include scholar programs such as the Rhodes, Truman, and Goldwater Scholarships. They also include other prestigious opportunities such as the Fulbright Program for U.S. Students and the National Science Foundation Graduate Research Fellowship Program.

Information about upcoming opportunities for Honors students appear regularly in our email bulletins (https://listserv.tamu.edu/cgi-bin/wa? A0=honors-l).

Services for All Students

LAUNCH challenges all motivated and high-achieving Texas A&M students to explore their world, expand their horizons and excel academically. While some services of the office are exclusive to Honors Students, advisors are available to talk with any undergraduate student who is interested in sampling the academic challenge of an Honors course, committing to an undergraduate research project, applying to the University Honors Program or engaging the process of self-discovery entailed in preparation for national fellowships. Students interested in applying to nationally competitive scholarships like the Rhodes, Marshall, Goldwater, and Fulbright U.S. Student Program should view our list of fellowship opportunities (http://natfellows.tamu.edu/National-Fellowships/About-National-Fellowships) and make note of instructions for our campus application processes (http://natfellows.tamu.edu/National-Fellowships/Apply-to-National-Fellowships-2016).

Continuing students with a minimum 3.5 cumulative GPR who have not applied or not been accepted to the Honors Fellows program may enroll in honors coursework during their assigned registration time. Students who would like to meet with a University Honors Program advisor may sign up for an appointment through our online appointment system (http://swan.tamu.edu/launch). All students interested in the services offered by LAUNCH are encouraged to sign up for the Honors weekly email bulletin.

Graduation with Honors

All Honors courses are designated on a student’s transcript, demonstrating to future employers or admissions committees that the student has engaged with an enriched, challenging curriculum. Students who complete the Honors Fellows curriculum and/or completion of the Undergraduate Research Scholars program are further denoted as graduation and transcript distinctions.

Undergraduates in some academic colleges and departments may pursue additional transcript distinctions (See http://honorsprograms.tamu.edu). These distinction requirements work in parallel with the Honors Fellows plan, but are separate and distinct from the University Honors Program. Many students elect to graduate with multiple distinctions from the university, college, or departmental offerings. In general, all Honors transcript distinctions require that the student complete a substantial body of Honors coursework, hold a minimum cumulative Texas A&M GPR of 3.5, and a cumulative Honors course GPR of 3.25, and meet other program participation requirements. Students are encouraged to work through their college
and/or departmental advisor to ensure satisfactory completion of the
distinction requirements.

These Honors transcript distinctions are separate and distinct from
“Latin Honors” such as *cum laude*, *summa cum laude* or *magna cum
laude*, which are conferred by the Office of the Registrar and are
based upon cumulative GPR and residency requirements (See http://
registrar.tamu.edu/Graduation-Degree-Programs/Graduation-Diplomas/
Graduation-with-Honors).
TRANSITION ACADEMIC PROGRAMS

Transition Academic Programs

Transition Academic Programs provides academic advising services for students transitioning between majors and programming for students transitioning from high school to college. Campus-wide programs coordinated by Transition Academic Programs include Aggie Gateways to Success and the Texas A&M Blinn TEAM (Transfer Enrollment to A&M) Program.

Academic Advising for Students in Transition

Transition Academic Programs helps students who are changing majors develop a realistic academic plan, transition into a new degree-granting major, and progress toward timely graduation. Currently enrolled Texas A&M students who move into Transition Academic Programs are only guaranteed one semester to complete necessary requirements to move into a degree-granting major.

Aggie Gateway to Success

Qualified students are selected for provisional admission by the Office of Admissions to participate in the Aggie Gateway to Success (AGS) program during the summer prior to their first fall semester at Texas A&M University. Participating students are assigned 6 hours of University Core Curriculum courses plus an Academic Success Center study skills class and participate in a learning community for the second summer session (July-August). Students who pass all assigned summer courses with at least a 2.0 grade point average earn the right to continue as a fully admitted student for the fall semester. Successful AGS students may compete for acceptance in any major program for which they meet regular change of curriculum requirements. Students are advised by Transition Academic Programs advisors about the best way to complete these requirements. Gateway students may apply for summer Financial Aid. Participants must reside on campus during the summer.

The Texas A&M Blinn TEAM Program

The Texas A&M-Blinn TEAM Program (TEAM) is a collaborative, co-enrollment partnership between Texas A&M University and Blinn College. To be considered for participation in the TEAM program, a prospective student must apply for regular freshman admission and meet all admission criteria. TEAM students enroll in a minimum of 12 total credit hours per semester, divided between Texas A&M and Blinn. TEAM students are able to transition into degree-granting departments at Texas A&M via the change of curriculum process if they have: Completed 45 Blinn and 15 Texas A&M credit hours, maintained required grades at both schools, and satisfied departmental entry criteria (to include any internal application processes). It is sometimes possible for TEAM students to transition in less than two years. TEAM students are able to access student services and programs on both campuses, to include participation in the Corps of Cadets and Greek Life. They may apply for on-campus housing at A&M, as well as financial aid (based upon their combined credit hours from both schools).

FOCUS Learning Community

LAUNCH promotes student success by providing high impact educational experiences and challenges motivated students in all academic disciplines to graduate from an enriched, intellectually-stimulating curriculum.

LAUNCH joins the university community in making Texas A&M a welcoming environment for all individuals. We are committed to helping our students understand the cultures which set us apart and appreciate the values that bring us together.

As a LAUNCH: Learning Community, FOCUS offers first-year Regents’ Scholarship recipients a full-year experience while they build Foundations of Continued Undergraduate Success (FOCUS). During the first year on campus, FOCUS students delve into connection, achievement, respect and exploration as guiding principles for personal development and individual responsibility in university life. Students meet weekly in one In-FOCUS Session of UGST 181 (zero-credit, S/U) each semester and benefit from professional staff guidance, undergraduate Community Leaders, in-hall programming, and monthly activities. FOCUS provides additional academic coaching, supplemental instruction, and tutoring and the option of joining an interest-centered track. Tracks require more student commitment during the year but provide additional opportunities for field-specific activities, mentoring by faculty or professional school students, and higher levels of interaction. With an academic advisor’s guidance, students may register for a small 25-student reserved section. FOCUS students are required to live in the FOCUS Living-Learning Community in Haas Hall and to participate in FOCUS orientation sessions prior to fall semester. Regents’ Scholars register for the program through the Living-Learning Programs application in the Residence Life housing portal during the spring prior to enrolling at Texas A&M University. Students who are not eligible for Regents’ Scholarships may register and request placement on the wait list.
The University Studies Degree provides students the flexibility to combine areas of study that are of special interest. The combination of courses may not be possible through existing degree plans. This flexibility may be attractive to students who have particular career paths or post-baccalaureate degree paths in mind.

A University Studies Degree consists of a concentration of 21-24 hours and two minors of 15-18 hours each and requires 120 hours for completion. One of the two minors must be completed in a college outside of the college that provides the concentration for the student’s degree. A University Studies major will be considered a student in the college that offers the concentration and will receive academic advising services from that college. The student’s diploma will list Bachelor of Arts or Bachelor of Science in University Studies.

Information on specific University Studies degree programs is listed with individual colleges.

**Texas A&M University**

- University Studies - BA, Journalism Studies Concentration (p. 560)
- University Studies - BA, Race, Gender, Ethnicity Concentration (p. 561)
- University Studies - BA, Religious Thought, Practices and Cultures Concentration (p. 563)
- University Studies - BA, Society, Ethics and Law Concentration (p. 564)
- University Studies - BS, Biomedical Sciences Concentration (p. 654)
- University Studies - BS, Business Concentration (p. 283)
- University Studies - BS, Child Professional Services (non-certification program) Concentration (p. 300)
- University Studies - BS, Dance Concentration (p. 323)
- University Studies - BS, Environmental Business Concentration (p. 183)
- University Studies - BS, Geographic Information Science and Technology Concentration (p. 448)
- University Studies - BS, Geography Concentration (p. 448)
- University Studies - BS, Global Arts Planning, Design, and Construction Concentration (p. 230)
- University Studies - BS, Health Humanities Concentration (p. 565)
- University Studies - BS, Leadership Studies Concentration (p. 135)
- University Studies - BS, Liberal Arts Concentration (p. 566)
- University Studies - BS, Mathematics for Business Concentration (p. 642)
- University Studies - BS, Mathematics for Pre-Professionals Concentration (p. 643)
- University Studies - BS, Mathematics for Teaching Concentration (p. 644)
- University Studies - BS, Race, Gender, Ethnicity Concentration (p. 567)
- University Studies - BS, Science for Secondary Teaching Concentration (p. 643)
- University Studies - BS, Sports Conditioning Concentration (p. 324)

**Texas A&M University Galveston Campus**

- University Studies - BS, Marine Environmental Law and Policy Concentration (p. 667)
- University Studies - BS, Maritime Public Policy and Communication Concentration (p. 668)
- University Studies - BS, Oceans and One Health Concentration (p. 687)
- University Studies - BS, Tourism and Coastal Community Development Concentration (p. 669)
INTERDISCIPLINARY DEGREE PROGRAMS

Majors

College of Agriculture and Life Sciences
- Bachelor of Science in Environmental Studies (p. 182)

College of Geosciences
- Bachelor of Science in Environmental Studies (p. 429)

School of Law
- Bachelor of Arts/Science and Juris Doctor Program (p. 109)

Minors
- Neuroscience Minor (p. 110)

Certificates
- Neuroscience Certificate (p. 111)

Masters
- Master of Agribusiness in Agribusiness (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/agribusiness)
- Master of Biotechnology in Biotechnology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/biotechnology)
- Master of Science in Energy (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/energy)
- Master of Science in Genetics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/genetics)
- Master of Science in Marine Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/marinebiology)
- Master of Science in Molecular and Environmental Plant Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/molecular-environmental-plantsciences)
- Master of Science in Neuroscience (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/neuroscience)
- Master of Science in Toxicology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/toxicology)
- Master of Science in Water Management and Hydrological Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/water-management)

Doctoral
- Doctor of Philosophy in Agribusiness and Managerial Economics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/agribusiness-managerial-economics)
- Doctor of Philosophy in Ecology and Evolutionary Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/evolutionarybiology)
- Doctor of Philosophy in Genetics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/genetics)
- Doctor of Philosophy in Marine Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/marinebiology)
- Doctor of Philosophy in Molecular and Environmental Plant Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/molecular-environmental-plantsciences)
- Doctor of Philosophy in Neuroscience (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/neuroscience)
- Doctor of Philosophy in Toxicology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/toxicology)
- Doctor of Philosophy in Water Management and Hydrological Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/interdisciplinary/water-management)

Bachelor of Arts/Science and Juris Doctor Program

Prior to enrolling in the School of Law, students must have completed at least 75% of their required undergraduate credit hours plus all additional graduation requirements published in their undergraduate catalog.

Credit for advanced placement, transfer, and dual credit courses are subject to the approval of each student’s undergraduate degree program. Students must complete the core curriculum requirements, thirty-six upper-level credit hours to satisfy university residency requirements (at least twelve upper-level credit hours must be in the major), and all additional graduation requirements published in their undergraduate catalog.

Student Application Process

Students should meet with pre-law advisor at Texas A&M University as soon as possible (at the latest by the completion of sixty acceptable degree program credit hours). Students must meet with their academic advisor at Texas A&M University no later than completion of sixty acceptable credit hours and must prepare a tentative degree plan for entry into the 3+3 program (all core curriculum hours, credit hours required to satisfy residency and major requirements, and graduation requirements to be included).

After completing between forty-five and sixty hours of credit, the student prepares for LSAT, takes test, and applies to the School of Law or applies to the School of Law through the “10% Rule.” The 10% Rule is a new American Bar Association Standard that allows a law school to admit up
to 10% of its incoming class from its home institution without requiring those students to take the LSAT. In particular, the 10% Rule requires that the student must have scored at or above the 85th percentile on the ACT or SAT; and that the student must be ranked in the top 10% of their undergraduate class through six semesters of academic work or have achieved a cumulative GPA of 3.5 or above through six semesters of academic work.

In the fall of a student's junior year (having completed approximately sixty credit hours), students apply for admission to the School of Law through the normal law school admissions process. During the fall and spring of the student's junior year, the School of Law admissions office interviews selected applicants and makes decision on whether to accept or deny each applicant. Successful applicants begin law school in the fall of the accepted year.

Students applying through the 3+3 program must have an undergraduate grade point ratio of at least 3.25. Each student is allowed one semester of grades below a 3.25. If a student requests to be considered for the 10% Rule, that student must have attained a 3.5 (or above) grade point ratio through six semesters.

All students applying through the 3+3 program must complete normal procedures required by the School of Law for admission (including application, transcripts, letters of recommendation, and LSAT [if applicable]). In addition, those students must interview with the School of Law during the application process and submit secondary application materials designed for prospective 3+3 students.

The decision of whether to admit a student to the School of Law, including any student who has applied to or been accepted into any 3+3 program at the undergraduate level, rests exclusively with the School of Law.

**Awarding of Undergraduate Degree**

**Timeline**

Students entering law school through the 3+3 program must enroll at the School of Law on a full-time basis. Their undergraduate degree will be awarded after successful completion of all coursework required for full-time, first-year law students at the TAMU School of Law (or at whatever later point students successfully complete at the School of Law the required number of credit hours remaining for their undergraduate degree), and successful completion of all undergraduate degree and graduation requirements at TAMU.

The student will be responsible for initiating graduation procedures with the Office of the Registrar to verify completion of degree requirements. The participating undergraduate department or program will complete the required degree audit, approve the necessary substitutions, and clear the student to graduate. Students accepted into the 3+3 program will be able to graduate after completion of all of their undergraduate degree and graduation requirements at TAMU, but no earlier than completion of the required first-year full-time coursework at Texas A&M University School of Law.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>LAW 7021</td>
<td>Criminal Law</td>
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</table>

**Neuroscience**

**Interdisciplinary Program in Neuroscience**

Chair: J. Welsh

Neuroscience is a field devoted to the scientific study of the nervous system, from its molecular/cellular underpinnings to the organization of neural circuits, and the manifestation of this biological/chemical machinery as behavioral, physiological and psychological processes. It aims to detail both how the normal system operates and how alterations in function contribute to clinical diseases, such as mental illness, dementia, developmental disorders, neurodegenerative diseases, chronic pain, drug addiction, and the loss of function with aging or neural injury.

**Minors**

Neuroscience Minor (p. 110)

**Certificates**

Neuroscience Certificate (p. 111)

**Neuroscience - Minor**

A minor in Neuroscience is considered an interdisciplinary minor with course selections in the Departments of Biology, Psychology, Philosophy and Veterinary Integrative Biosciences. Please be aware that each course selection may have prerequisite requirements that must be met.

To apply for admission to the Minor in Neuroscience, students must complete the Minor Approval Form. It must be signed by the NRSC academic advisor and then submitted to your major advisor.

**Program Requirements**

The coursework listed represents various sub-disciplines within the field of Neuroscience and would give the student an overall knowledge base fitting a minor in Neuroscience. No grade below a C is acceptable to meet minor requirements.

<table>
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<td>LAW 7418</td>
<td>Legislation and Regulation</td>
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Spring

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<td>LAW 7032</td>
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<td>LAW 7002</td>
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<table>
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<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
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</table>

Total Semester Credit Hours

29

Additional information about the law school's course of study, as well as its academic rules, can be found at https://law.tamu.edu/current-students/registrar-student-services/rules-policies.
NRSC 289  Special Topics in...
NRSC 311/ PSYC 311  Psychology of Animal Behavior
NRSC 320/ PSYC 320  Sensation-Perception
NRSC 331/ PSYC 331  Social Neuroscience
NRSC 332/ PSYC 332  Neuroscience of Learning and Memory
NRSC 333/ PSYC 333  Biology of Psychological Disorders
NRSC 335/ PSYC 335  Physiological Psychology
NRSC 340/ PSYC 340  Psychology of Learning
NRSC 360/ PSYC 360  Health Psychology and Behavioral Medicine
NRSC 401/ VIBS 401  Developmental Neurotoxicology
NRSC 407/ VIBS 407  Core Ideas in Neuroscience
NRSC 434/ BIOL 434  Regulatory and Behavioral Neuroscience
NRSC 450/ VIBS 450  Mammalian Functional Neuroanatomy
NRSC 485 Directed Studies
NRSC 489 Special Topics in...
NRSC 491 Research
PHIL 320 Philosophy of Mind
BIOL 388 Principles of Animal Physiology
BIOL 435 Laboratory for Regulatory and Behavioral Neuroscience

Total Semester Credit Hours 15

The minor must be declared before the student has completed 95 credit hours.

Student must make a grade of C or better.

For Psychology students, no more than 6 credit hours can be counted toward both the Neuroscience Minor and the Psychology Major.

A total of 6 hours of directed research (485/491) may be counted toward the minor. Directed studies may be conducted with any member of the faculty of Neuroscience. Research experiences must be approved by the NRSC faculty mentor.

Neuroscience - Certificate

The Neuroscience Certificate, offered by the Texas A&M Institute for Neuroscience (TAMIN), provides students with the opportunity to acquire enhanced training in research in various aspects of the nervous system of humans and other animals. Students in this Certificate Program will gain a broader understanding of how the nervous system functions during health and disease through enriched experiences in areas of molecular, structural, physiological, cognitive, behavioral, computational, or bioengineering neuroscience. The Neuroscience Certificate requires completion of 16 hours of course work in designated courses. Students must complete, prior to graduation, a combination of coursework and inquiry-based research (or an internship), which will be completed under the supervision of a TMIN faculty member.

Steps:

Normally, students should apply to the Neuroscience Certificate program approximately two years before they plan to graduate. For the first two years of the program (Fall 2014-Spring 2016), students who are further along in the program may apply (and are expected to complete all requirements). To apply, students must:

1. Identify a faculty advisor who is willing to supervise Directed Studies in Research (NRSC 485/491). Working with the faculty advisor, the student must develop a brief (one paragraph) description of the proposed line of research.
2. Complete the Neuroscience Certificate Program form and have the faculty advisor sign it.
3. Submit the form to the TAMIN Coordinator in the Interdisciplinary Life Sciences Building, Room 3148.

Students must maintain the required GPA for their major.

Students must present their research at one TAMU Student Research Week and a poster at the Annual TAMIN Neuroscience Symposium held in the spring semester.

Students are expected to file a degree plan for their major within the administering department at the start of their junior year.

Students wishing to obtain an Honors Neuroscience Certificate must maintain a GPA of 3.5. Please visit the Honors Office in Henderson Hall to request honors credit and to complete any paperwork required by that office.

Program Requirements

<table>
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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<td>NRSC 277/ VIBS 277</td>
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<td>NRSC 340/ PSYC 340</td>
<td>Psychology of Learning</td>
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<td>NRSC 434/ BIOL 434</td>
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<tr>
<td>NRSC 332/ PSYC 332</td>
<td>Neuroscience of Learning and Memory</td>
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Required Courses

Prescribed electives 8

Code        | Title                                    | Semester Credit Hours |
<table>
<thead>
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<tbody>
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NRSC 340/ PSYC 340  Psychology of Learning
NRSC 360/ PSYC 360  Health Psychology and Behavioral Medicine
NRSC 401/ VIBS 401  Developmental Neurotoxicology
NRSC 434/ BIOL 434  Regulatory and Behavioral Neuroscience
NRSC 450/ VIBS 450  Mammalian Functional Neuroanatomy

Other electives
BICH 410  Comprehensive Biochemistry I
BICH 411  Comprehensive Biochemistry II
BICH 431/ GENE 431  Molecular Genetics
BIOL 319  Integrated Human Anatomy and Physiology I
BIOL 320  Integrated Human Anatomy and Physiology II
BIOL 388  Principles of Animal Physiology
BIOL 413  Cell Biology
BIOL 423  Cell Biology Laboratory
GENE 302  Principles of Genetics
GENE 405/ BIMS 405  Mammalian Genetics
GENE 431/ BICH 431  Molecular Genetics

NUTR 469/ FSTC 469  Experimental Nutrition and Food Science Laboratory
PHIL 320  Philosophy of Mind

Total Semester Credit Hours 16

1 No more than six credits can be used towards the Neuroscience Certificate. This limit does not preclude students from taking additional hours. Those hours will not, however, count towards the 16 credit hours needed to complete the Neuroscience Certificate.

2 If a student takes more than one course, it can count towards their electives.
COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Administrative Officers
Vice Chancellor and Dean - Mark A. Hussey, Ph.D.
Executive Associate Dean - Alan Sams, Ph.D.
Associate Dean for Academic Operations - Kim E. Dooley, Ph.D.
Associate Dean for Graduate Programs and Faculty Development - David W. Reed, Ph.D.
Associate Dean for Student Development - Chris L. Skaggs, Ph.D.
Assistant Dean for Student Success - Danielle A. Harris, Ph.D.

General Statement
Ensuring an adequate and safe food supply for a rapidly expanding world population, succeeding in a global economy, and maintaining our planet’s natural resources and biodiversity are some of the challenges that are being met by graduates from the College of Agriculture and Life Sciences. Our students apply knowledge to solve problems as scientists, business leaders, engineers, educators, physicians, and other professionals.

Enthusiastic and competitive students, a distinguished faculty, innovative teaching methods, outstanding advisors, and abundant experiential learning opportunities, result in the College of Agriculture and Life Sciences being considered one of the top colleges of agriculture and life sciences in the country.

Our 30 majors and 25 minors provide students technical expertise and a broad education so that they can meet the challenges of feeding the world, improving health, protecting the environment, growing our economy, and enriching youth. Abilities to think creatively and critically, solving problems, making decisions and communicating effectively are developed, along with learning how to work with people of varied backgrounds. Relating well with others, leadership and followership are vital to professional success. Faculty members who teach undergraduate classes include many who are recognized nationally and internationally for research and other accomplishments in their disciplines. Interested undergraduates also have a chance to be a part of research projects themselves.

There are many opportunities for high impact courses and programs, such as undergraduate research, international experiences, internships, and field study. The college has study abroad programs in the Americas, Asia, Europe, Oceania, Africa, and the Caribbean. All students are encouraged to participate in at least one of these high impact activities before graduation. Honors programs are available in many of the college’s academic departments. There are numerous student organizations that are sponsored by departments or the college such as the Freshman Leadership Experience and the College of Agriculture and Life Sciences Student Council. These organizations promote interaction among students who share interests and foster leadership skills.

The College of Agriculture and Life Sciences and its departments offer a variety of scholarships to students on a competitive basis. Many are reserved for incoming freshmen or transfer students. Additional information and application forms for college-level scholarships for current students can be obtained from the Scholarships & Financial Aid Office. Information about departmental scholarships can be obtained from the departments directly.

College of Agriculture and Life Sciences Baccalaureate Degree Programs
Each major can be planned to prepare students for graduate study or admission to professional schools in medicine, dentistry, veterinary medicine, other health professions, and law. Students in programs, such as biochemistry, genetics, and nutritional sciences, are highly recruited for medicine, nursing, and other health professions. Animal science and wildlife and fisheries sciences are among several excellent choices for students interested in veterinary medicine. Students with a background in natural resources, the agricultural industry, forensics, or life sciences can use that knowledge well if they choose to enter law school. An environmental lawyer with a degree in a natural resource area is better equipped to incorporate the science with the law.

Advising is provided for each student in the college through offices in the individual academic departments. Departmental faculty and professional advisors provide assistance on course selection and other academic issues. They also serve as mentors for career planning and admission to graduate or professional school. Advisors serve as professional consultants for students in the College with the objective of avoiding problems if possible and solving problems if needed.

Requirements for Graduation
Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

International and Cultural Diversity Requirement
Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the Graduation requirements. Meeting this requirement will require the careful selection of courses. The student is directed to the Requirements for a Baccalaureate Degree (p. 27) section of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student’s academic advisor.

Internships
Internships provide real-world experience in industries related to a student’s education and professional career preparation. Students return to campus with a broader perspective and more intense interest in their education. The experiences are so valuable that many students complete more than one internship. Most departments in the College offer academic credit for the satisfactory completion of an internship. In fact, an internship is required for graduation in some degree programs.

The Agricultural and Natural Resources Policy (ANRP) Internship Program places students from the College of Agriculture and Life Sciences in policy-based internships in Austin, TX, Washington, D.C. and Rome, Italy for a semester or summer. Selection for the program is based upon factors such as academic performance, leadership, and a student’s general interest in learning the policy process.

Graduate Study
All departments in the College of Agriculture and Life Sciences offer graduate degrees at the master’s and doctoral levels. Many departments offer courses and programs online.

Students are encouraged to contact the department in which they wish to obtain information about graduate study. Information on admission, programs available, etc., can be found in the Texas A&M University Graduate and Professional Catalog.

**Teacher Certification**

Texas teacher certification in agricultural science is available through the Department of Agricultural Leadership, Education, and Communications. Certification is granted through the State Board of Educator Certification (SBEC) upon a student’s completion of the course of study administered by the department. The undergraduate major in agricultural science includes all coursework required for teacher certification. The requirements can be completed with any major in the College of Agriculture and Life Sciences. See an advisor in Agricultural Science, Department of Agricultural Leadership, Education, and Communications, for more information.

**Majors**

**College of Agriculture and Life Sciences**

- Bachelor of Science in Renewable Natural Resources (p. 156)

**Department of Agricultural Economics**

- Bachelor of Science in Agribusiness (p. 120)
- Bachelor of Science in Agricultural Economics, Finance and Real Estate Option (p. 122)
- Bachelor of Science in Agricultural Economics, Food Marketing Systems Option (p. 123)
- Bachelor of Science in Agricultural Economics, Policy and Economic Analysis Option (p. 124)
- Bachelor of Science in Agricultural Economics, Rural Entrepreneurship Option (p. 125)
- Bachelor of Science in Agricultural Economics and Master of Public Service and Administration, 5-Year Degree Program (p. 126)

**Department of Agricultural Leadership, Education, and Communications**

- Bachelor of Science in Agricultural Communications and Journalism (p. 132)
- Bachelor of Science in Agricultural Leadership and Development (p. 133)
- Bachelor of Science in Agricultural Science (p. 134)
- Bachelor of Science in University Studies, Leadership Studies Concentration (p. 135)

**Department of Animal Science**

- Bachelor of Science in Animal Science, Production/Industry Option (p. 138)
- Bachelor of Science in Animal Science, Science Option (p. 140)

**Department of Biochemistry and Biophysics**

- Bachelor of Science in Biochemistry (p. 143)
- Bachelor of Science in Genetics (p. 144)

**Department of Biological and Agricultural Engineering**

- Bachelor of Science in Agricultural Systems Management (p. 147)
- Bachelor of Science in Biological and Agricultural Engineering (p. 148) — offered in conjunction with the College of Engineering

**Department of Ecosystem Science and Management**

- Bachelor of Science in Ecological Restoration (p. 151)
- Bachelor of Science in Forestry (p. 152)
- Bachelor of Science in Rangeland Ecology and Management, Ranch Management Option (p. 153)
- Bachelor of Science in Rangeland Ecology and Management, Rangeland Resources Option (p. 155)
- Bachelor of Science in Renewable Natural Resources (p. 156)
- Bachelor of Science in Spatial Sciences (p. 158)

**Department of Entomology**

- Bachelor of Science in Entomology (p. 161)
- Bachelor of Science in Forensic and Investigative Sciences, Pre-Law Emphasis (p. 163)
- Bachelor of Science in Forensic and Investigative Sciences, Science Emphasis (p. 165)

**Department of Horticultural Sciences**

- Bachelor of Arts in Horticulture (p. 168)
- Bachelor of Science in Horticulture (p. 169)

**Department of Nutrition and Food Science**

- Bachelor of Science in Food Science and Technology, Food Industry Option (p. 172)
- Bachelor of Science in Food Science and Technology, Food Science Option (p. 174)
- Bachelor of Science in Nutrition, Didactic Program in Dietetics Track (p. 176)
- Bachelor of Science in Nutrition, General Nutrition Track (p. 177)
- Bachelor of Science in Nutrition, Molecular and Experimental Track (p. 179)

**Department of Plant Pathology and Microbiology**

- Bachelor of Science in Bioenvironmental Sciences (p. 181)
- Bachelor of Science in Environmental Studies (p. 182)
- Bachelor of Science in University Studies, Environmental Business Concentration (p. 183)
Department of Poultry Science
- Bachelor of Science in Poultry Science, Industry Emphasis (p. 185)
- Bachelor of Science in Poultry Science, Technical Emphasis (p. 186)

Department of Recreation, Park and Tourism Sciences
- Bachelor of Science in Recreation, Park and Tourism Sciences with Certificate (p. 189)
- Bachelor of Science in Renewable Natural Resources (p. 156)

Department of Soil and Crop Sciences
- Bachelor of Science in Plant and Environmental Soil Science, Crops Emphasis (p. 197)
- Bachelor of Science in Plant and Environmental Soil Science, Soil and Water Emphasis (p. 198)
- Bachelor of Science in Turfgrass Science (p. 199)

Department of Wildlife and Fisheries Sciences
- Bachelor of Science in Renewable Natural Resources (p. 156)
- Bachelor of Science in Wildlife and Fisheries Sciences, Aquatic Ecology and Conservation Option (p. 205)
- Bachelor of Science in Wildlife and Fisheries Sciences, Vertebrate Zoology Option (p. 206)
- Bachelor of Science in Wildlife and Fisheries Sciences, Wildlife Ecology and Conservation Option (p. 208)

Minors
Minors consist of a group of specified courses totaling between 15 and 18 credit hours. Students who are eligible to enroll in a minor should contact an advisor in the department offering the minor. Minors available in the college are listed.

Department of Agricultural Economics
- Agribusiness Entrepreneurship Minor
- Agricultural Economics Minor (p. 129)
- AgriFood Sales Minor (p. 129)
- Financial Planning Minor (p. 130)

Department of Agricultural Leadership, Education, and Communications
- Agricultural Communications and Journalism Minor (p. 135)
- Extension Education Minor (p. 136)
- International Agricultural Development Minor (p. 136)
- Leadership Minor (p. 136)

Department of Biochemistry and Biophysics
- Biochemistry Minor (p. 146)
- Genetics Minor (p. 146)

Department of Biological and Agricultural Engineering
- Agricultural Systems Management Minor (p. 150)

Department of Ecosystem Science and Management
- Forestry Minor (p. 158)
- Rangeland Ecology and Management Minor (p. 159)
- Spatial Sciences Minor (p. 159)

Department of Entomology
- Entomology Minor (p. 166)

Department of Horticultural Sciences
- Horticulture Minor (p. 170)

Department of Plant Pathology and Microbiology
- Bioenvironmental Sciences Minor (p. 184)

Department of Poultry Science
- Poultry Science Minor (p. 187)

Department of Recreation, Park and Tourism Science
- Park and Natural Resource Management Minor (p. 192)
- Recreation, Park and Tourism Sciences Minor (p. 193)
- Tourism Management Minor (p. 193)
- Youth Development Minor (p. 193)

Department of Soil and Crop Sciences
- Agronomy Minor (p. 200)
- Environmental Soil Science Minor (p. 200)
- Plant Breeding Minor (p. 201)

Department of Wildlife and Fisheries Sciences
- Wildlife and Fisheries Sciences Minor (p. 209)

Certificates
Certificate programs document expertise in an area beyond a major or minor. Information on requirements for certificate programs is available from the advisor of the department offering the certificate. Certificate programs available in the college are listed.

Department of Agricultural Economics
- International Trade and Agriculture Certificate (p. 130)

Department of Animal Science
- Equine Science Certificate (p. 141)
- Meat Science Certificate (p. 141)
Department of Ecosystem Science and Management

- Watershed Certificate (p. 159)

Department of Entomology

- Public Health Entomology Certificate (p. 167)

Department of Horticultural Sciences

- Enology Certificate (p. 170)

Department of Recreation, Park and Tourism Science

- Community Recreation and Park Administration Certificate (p. 194)
- Hospitality Management Certificate (p. 194)
- Parks and Conservation Certificate (p. 194)
- Professional Event Manager Certificate (p. 195)
- Tourism Management Certificate (p. 195)
- Youth Development Certificate (p. 195)

Masters

College of Agriculture and Life Sciences

- Master of Natural Resources Development in Natural Resources Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/recreation-park-tourism-sciences/mnrd)
- Master of Science in Plant Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/horticultural-sciences/plant-breeding-ms)

Department of Agricultural Economics

- Master of Agriculture in Agricultural Economics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-economics/agriculture-masters)
- Master of Science in Agricultural Economics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-economics/ms)

Department of Agricultural Leadership, Education, and Communications

- Master of Agriculture in Agricultural Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-leadership-education-communications/agricultural-development-agriculture-masters)
- Master of Education in Agricultural Leadership, Education and Communication—offered in conjunction with the College of Education and Human Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-leadership-education-communications/med)
- Master of Science in Agricultural Leadership, Education and Communication—offered in conjunction with the College of Education and Human Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-leadership-education-communications/ms)

Department of Animal Science

- Master of Agriculture in Animal Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/magr)
- Master of Equine Industry Management in Equine Industry Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/equine-industry-reproduction-ms)
- Master of Science in Animal Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/animal-breeding-ms)
- Master of Science in Animal Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/ms)
- Master of Science in Physiology of Reproduction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/physiology-reproduction-ms)

Department of Biochemistry and Biophysics

- Master of Science in Biochemistry (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biochemistry-biophysics/biochemistry-ms)

Department of Biological and Agricultural Engineering

- Master of Agriculture in Agricultural Systems Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biological-agricultural-engineering/systems-management-magr)
- Master of Engineering in Biological and Agricultural Engineering—offered in conjunction with the College of Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biological-agricultural-engineering/engineering-meng)
- Master of Science in Agricultural Systems Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biological-agricultural-engineering/systems-management-ms)
- Master of Science in Biological and Agricultural Engineering—offered in conjunction with the College of Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biological-agricultural-engineering/engineering-ms)

Department of Ecosystem Science and Management

- Master of Agriculture in Ecosystem Science and Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/ecosystem-science-management/magr)
- Master of Natural Resources Development in Natural Resources Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/ecosystem-science-management/mnrd)
- Master of Science in Ecosystem Science and Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/ecosystem-science-management/ms)
Department of Entomology
- Master of Science in Entomology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/entomology/ms)

Department of Horticultural Sciences
- Master of Agriculture in Horticulture (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/horticultural-sciences/magr)
- Master of Science in Horticulture (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/horticultural-sciences/plant-breeding-ms)

Department of Nutrition and Food Science
- Master of Science in Food Science and Technology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/nutrition-food-science/ms)

Department of Plant Pathology and Microbiology
- Master of Science in Plant Pathology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/plant-pathology-microbiology/ms)

Department of Poultry Science
- Master of Agriculture in Poultry Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/poultry-science/magr)
- Master of Science in Poultry Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/poultry-science/ms)

Department of Recreation, Park and Tourism Sciences
- Master of Natural Resources Development in Natural Resources Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/tourism-sciences/soil-crop-sciences/agronomy-ms)
- Master of Science in Plant Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/tourism-sciences/plant-breeding-ms)
- Master of Science in Soil Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/tourism-sciences/soil-science/ms)

Department of Soil and Crop Sciences
- Master of Science in Agronomy (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/soil-crop-sciences/soil-crop-sciences/agronomy-ms)
- Master of Science in Plant Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/soil-crop-sciences/plant-breeding-ms)
- Master of Science in Soil Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/soil-crop-sciences/soil-science-ms)

Department of Wildlife and Fisheries Sciences
- Master of Natural Resources Development in Natural Resources Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/mnrdd)
- Master of Science in Wildlife and Fisheries Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/ms)

Doctoral

College of Agriculture and Life Sciences
- Doctor of Philosophy in Plant Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/plant-breeding-phd)

Department of Agricultural Economics
- Doctor of Philosophy in Agricultural Economics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-economics/phd)

Department of Agricultural Leadership, Education, and Communications
- Doctor of Education in Agricultural Education—offered as a joint program with Texas Tech University when offered by Distance Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-leadership-education-communications/edd)
- Doctor of Philosophy in Agricultural Leadership, Education and Communication—offered in conjunction with the College of Education and Human Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/agricultural-leadership-education-communications/phd)

Department of Animal Science
- Doctor of Philosophy in Animal Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/animal-breeding-phd)
- Doctor of Philosophy in Animal Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/phd)
• Doctor of Philosophy in Physiology of Reproduction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/animal-science/physiology-reproduction-phd)

Department of Biochemistry and Biophysics
• Doctor of Philosophy in Biochemistry (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biochemistry-biophysics/phd)

Department of Biological and Agricultural Engineering
• Doctor of Philosophy in Biological and Agricultural Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/biological-agricultural-engineering/phd)

Department of Ecosystem Science and Management
• Doctor of Philosophy in Ecosystem Science and Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/ecosystem-science-management/phd)

Department of Entomology
• Doctor of Philosophy in Entomology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/entomology/phd)

Department of Horticultural Sciences
• Doctor of Philosophy in Horticulture—also offered as cooperative program with Texas A&M University - Kingsville (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/horticultural-sciences/horticulture-phd)

Department of Nutrition and Food Science
• Doctor of Philosophy in Food Science and Technology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/nutrition-food-science/food-science-technology-phd)

Department of Plant Pathology and Microbiology
• Doctor of Philosophy in Plant Pathology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/plant-pathology-microbiology/phd)

Department of Poultry Science
• Doctor of Philosophy in Poultry Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/poultry-science/phd)

Department of Recreation, Park and Tourism Sciences
• Doctor of Philosophy in Recreation, Park and Tourism Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/recreation-park-tourism-sciences/phd)

Department of Soil and Crop Sciences
• Doctor of Philosophy in Agronomy (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/soil-crop-sciences/agronomy-phd)
• Doctor of Philosophy in Plant Breeding (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/soil-crop-sciences/plant-breeding-phd)
• Doctor of Philosophy in Soil Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/soil-crop-sciences/soil-science-phd)

Department of Wildlife and Fisheries Sciences
• Doctor of Philosophy in Wildlife and Fisheries Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/phd)

Interdepartmental Degree Programs
The Bachelor of Science in Renewable Natural Resources degree is an interdepartmental degree in the College of Agriculture and Life Sciences. It is offered in the Department of Ecosystem Science and Management (p. 150), the Department of Recreation, Parks and Tourism Sciences (p. 187) and the Department of Wildlife and Fisheries Sciences (p. 203).

Majors
• Bachelor of Science in Renewable Natural Resources (p. 156)

Department of Agricultural Economics
The Department of Agricultural Economics offers a Bachelor of Science degree in Agricultural Economics. The BS degree in Agricultural Economics offers students four options: Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. The course requirements for the freshman and sophomore years are the same for all Agricultural Economics options. In conjunction with the Bush School of Government and Public Service, the department offers a five-year program that allows a student to receive a BS in AGEC and a Master's of Public Service and Administration degree. In addition, in conjunction with the Mays Business School, the department also offers a BS in Agribusiness.
Department of Agricultural Economics Honors Plan

The Department of Agricultural Economics at Texas A&M University offers academically talented Agricultural Economics and Agribusiness majors an opportunity to study, experience, learn, and grow. This honors plan will enrich your college experience by offering curricular challenge and stimulating your interest in research. Through the Agricultural Economics departmental honors plan, you will have an opportunity to work closely with faculty members and have in-depth conversations about class topics as well their areas of research. You will develop the vital problem solving and critical thinking skills that are valued in today’s fast-paced business culture. Honors distinctions will demonstrate your ability to handle a challenging curriculum, which can be particularly useful if you are planning to attend graduate school or law school. The challenging coursework and fascinating co-curricular activities offered through this program will enhance your academic success.

The Department of Agricultural Economics Honors Plan is administered through the Undergraduate Programs Office, located in Room 214 of the Agriculture and Life Sciences Building. For more information, contact the Undergraduate Programs Office, (979) 845-4911, or visit our website at http://agecon.tamu.edu/undergraduate/current-students/honors/ and select the Future or Current Students link.

Faculty

Bessler, David A, Professor
Agricultural Economics
PHD, University of California, Davis, 1977

Boadu, Frederick O, Professor
Agricultural Economics
PHD, University of Kentucky, 1981

Buenger, Sarah D, Lecturer
Agricultural Economics
MS, College for Financial Planning, 2015

Conner, James R, Senior Professor
Agricultural Economics
PHD, Texas A&M University, 1970

Harness, Nathaniel J, Instructional Associate Professor
Agricultural Economics
PHD, Texas Tech University, 2007

Ishdorj, Ariun, Associate Professor
Agricultural Economics
PHD, Iowa State University, 2008

Leatham, David J, Professor
Agricultural Economics
PHD, Purdue University, 1983

Litzenberg, Kerry K, Professor
Agricultural Economics
PHD, Purdue University, 1979

McCarl, Bruce A, Distinguished Professor
Agricultural Economics
PHD, The Pennsylvania State University, 1973

Menzies, Max D, Lecturer
Agricultural Economics
MS, Texas A&M University, 2004

Mjelde, James W, Professor
Agricultural Economics
PHD, University of Illinois at Urbana-Champaign, 1985

Moore, Christopher M, Lecturer
Agricultural Economics
MBA, Texas A&M University Commerce, 2013

Ng, Desmond W, Associate Professor
Agricultural Economics
PHD, University of Illinois at Urbana-Champaign, 2001

Penson, John B, Professor
Agricultural Economics
PHD, University of Illinois at Urbana-Champaign, 1973

Price, Edwin C, Professor
Agricultural Economics
PHD, University of Kentucky, 1973

Richardson, James W, Professor
Agricultural Economics
PHD, Oklahoma State University, 1978

Rister, M E, Professor
Agricultural Economics
PHD, Michigan State University, 1981

Salin, Victoria S, Professor
Agricultural Economics
PHD, Purdue University, 1996

Senarath Dharmasena, Kalu A, Instructional Assistant Professor
Agricultural Economics
PHD, Texas A&M University, 2010

Shaw, William D, Professor
Agricultural Economics
PHD, University of Colorado, 1985

Siebert, John W, Professor
Agricultural Economics
PHD, University of California, Berkeley, 1978

Stebbins, Richard A, Professor
Agricultural Economics
JD, Texas Tech School of Law, 2005
MS, Texas Tech University, 2005

Stevens, Reid, Assistant Professor
Agricultural Economics
PHD, University of California, Berkeley, 2015

Vedenov, Dmitry, Associate Professor
Agricultural Economics
PHD, The Ohio State University, 2001

Williams, Gary W, Professor
Agricultural Economics
PHD, Purdue University, 1981
Upper-Level Entry into Agribusiness

The requirements and procedures for consideration for upper level are as follows:

1. In order to be considered for upper-level and possible admission into the program of study in agribusiness, a student must have:
   a. Satisfactorily completed at least 60 semester credit hours.
   b. Satisfactorily completed all of the following eight courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
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</tr>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 217</td>
<td>Fundamentals of Agricultural Economics Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics 1</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
</tbody>
</table>

1. This requirement may be met with MATH 140

   c. Students should complete the freshman and sophomore sequence of courses as listed under Curriculum in Agribusiness. Following this sequence will allow the timely application for consideration for upper-level.

   d. Admission, if granted, will be effective upon successful completion of the in-process courses; however, if all requirements are not met prior to the start of the next semester, admission will be revoked.

2. Transfer students: Transfer students admitted to the Agribusiness degree will be classified as AGBL (lower-level Agribusiness) students until they complete all requirements listed previously in item 1.

3. Change of curriculum students: Texas A&M students who change curriculum into the Agribusiness degree from another college or department at the University will be classified as AGBL (lower-level Agribusiness) students until they complete all requirements listed in item 1.
American History (p. 25) 2 3
Creative arts elective (p. 24) 3
Language, philosophy and culture elective (p. 23) 3
Life and physical sciences elective (p. 22) 3

Semester Credit Hours 15

Second Year
Fall
ACCT 229 Introductory Accounting 3
ECON 202 Principles of Economics 3
MGMT 211 Legal and Social Environment of Business 3
Government/Political science elective (p. 25) 2 3
Life and physical sciences elective (p. 22) 3

Semester Credit Hours 15

Spring
ACCT 230 Introductory Accounting 3
AGEC 217 Fundamentals of Agricultural Economics Analysis 4 3
ECON 203 Principles of Economics 3
Communication elective (p. 22) 3
Government/Political science elective (p. 25) 2 3

Semester Credit Hours 15

Third Year
Fall
AGEC 340 Agribusiness Management 3
FINC 341 Business Finance 3
ECON 323 Microeconomic Theory 3
MKTG 321 Marketing 3
SCMT 303 Statistical Methods 3

Semester Credit Hours 15

Spring
AGEC 317 Economic Analysis for Agribusiness Management 3
AGEC 429 Agricultural Policy 4 3
MGMT 363 Managing People in Organizations 3
SCMT 364 Operations Management 3
Directed elective-international 5 3

Semester Credit Hours 15

Fourth Year
Fall
AGEC 431 Cases in Agribusiness Finance 7 3
AGEC 481 Ethics in Agribusiness and Agricultural Economics 1 3
Directed elective-international 5 3
General electives 7 5
Technical agricultural elective 6 3

Semester Credit Hours 15

Spring
AGEC 414 Agribusiness and Food Market Analysis 3
AGEC 430 Macroeconomics of Agriculture or ECON 311 or Money and Banking 3
AGEC 440 Agribusiness Strategic Analysis 3

Semester Credit Hours 15

General electives 7 6

Semester Credit Hours 15

Total Semester Credit Hours 120

1 Satisfies the University Core Curriculum Social and Behavioral Sciences requirement.
2 For those students under ROTC contract, see Requirement 7 of the Requirements for a Baccalaureate Degree (p. 28).
3 Three hours must be selected from ENGL 103 or ENGL 104.
4 All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.
5 Six hours required. A complete list of approved international electives is available in the college Undergraduate Program Office, Room 214 of the Agriculture and Life Sciences Building, or can be found on our website.
6 Three hours of technical agriculture electives to be selected from any course offered by the College of Agriculture and Life Sciences except 285s, 484s, 485s and agricultural economics courses. To be selected in consultation with an advisor.
7 Any Texas A&M or transfer course (except KINE 198 and KINE 199; STLC 001-STLC 003) not used to meet other requirements.
Agricultural Economics - BS, Finance and Real Estate Option

The Bachelor of Science degree in Agricultural Economics offers students four options: Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. The course requirements for the freshman and sophomore years are the same for all Agricultural Economics options.

The Agricultural Economics program is designed to assist in the development of skills in agriculture, applied economics, and economic logic which students can utilize to analyze and communicate about financial, real estate, sales, marketing, policy, and entrepreneurship issues in Texas, the nation, and the world. Graduates are trained for a wide variety of jobs in agricultural and nonagricultural oriented businesses, firms, and agencies in both the public and private sectors. Flexibility is included in the curriculum so that a student, in consultation with an academic advisor, can develop a degree program which best fits personal career objectives and could include one or more of the following experiences: industry internship; the Agricultural and Natural Resources Policy Internship program; and research, directed studies, or study abroad opportunities.

Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

Finance and Real Estate Option

The Finance and Real Estate option is designed to provide a well-founded basis in principles, concepts and methods for students interested in finance and/or real estate professional careers in the agricultural industry and/or related professions.

Program Requirements

<table>
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<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
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<tr>
<td>Fall</td>
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<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics 3</td>
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<tr>
<td>AGLS 101</td>
<td>Modern Agricultural Systems and Renewable Natural Resources 1</td>
</tr>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition 3</td>
</tr>
<tr>
<td>or ENGL 104</td>
<td>or Composition and Rhetoric 3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics 3</td>
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<tr>
<td>or MATH 140</td>
<td>or Mathematics for Business and Social Sciences 3</td>
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<tr>
<td>American history elective (p. 25) 1</td>
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<tr>
<td>Technical agriculture elective 2</td>
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<tbody>
<tr>
<td>MATH 142</td>
<td>Business Calculus 3</td>
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<td>American history elective (p. 25) 1</td>
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<td>Creative Arts elective (p. 24) 3</td>
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<td>Language, philosophy and culture elective (p. 23) 3</td>
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<td>Life and physical sciences elective (p. 22) 3</td>
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<th>Second Year</th>
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<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles 3</td>
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<td>AGEC 217</td>
<td>Fundamentals of Agricultural Economics Analysis 3</td>
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<td>ECON 202</td>
<td>Principles of Economics 3</td>
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<td>Government/Political science elective (p. 25) 1</td>
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<tr>
<td>ACCT 210</td>
<td>Survey of Managerial and Cost Accounting Principles 3</td>
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<td>ECON 203</td>
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<tr>
<td>Communication elective (p. 22) 3</td>
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<td>Government/Political science elective (p. 25) 1</td>
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<tr>
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<tr>
<td>AGEC 314</td>
<td>Marketing Agricultural and Food Products 3</td>
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<td>AGEC 330</td>
<td>Financial Management in Agriculture 3</td>
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<td>AGEC 422</td>
<td>Land Economics 3</td>
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<td>ECON 323</td>
<td>Microeconomic Theory 3</td>
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<td>STAT 303</td>
<td>Statistical Methods 3</td>
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<td>Directed non-agricultural economics elective 5</td>
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<tr>
<td>AGEC 317</td>
<td>Economic Analysis for Agribusiness Management 3</td>
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<td>AGEC 429</td>
<td>Agricultural Policy 4</td>
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<td>AGEC 481</td>
<td>Ethics in Agribusiness and Agricultural Economics 1</td>
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<td>Directed agricultural economics elective 6</td>
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<tr>
<td>Directed non-agricultural economics elective 5</td>
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<tr>
<td>General elective 7</td>
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<td>Semester Credit Hours</td>
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<td>Fall</td>
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<tr>
<td>AGEC 340</td>
<td>Agribusiness Management 3</td>
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<tr>
<td>AGEC 424</td>
<td>Agribusiness Entrepreneurship – Economic Analysis 3</td>
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<tr>
<td>Directed agricultural economics elective 6</td>
<td>3</td>
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<tr>
<td>Directed non-agricultural economics elective 5</td>
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<tr>
<td>General elective 7</td>
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<td>Semester Credit Hours</td>
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<tr>
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<tbody>
<tr>
<td>AGEC 430</td>
<td>Macroeconomics of Agriculture 3</td>
</tr>
</tbody>
</table>
Agricultural Economics - BS, Food Marketing Systems Option

The Bachelor of Science degree in Agricultural Economics offers students four options: Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. The course requirements for the freshman and sophomore years are the same for all Agricultural Economics options.

The Agricultural Economics program is designed to assist in the development of skills in agriculture, applied economics, and economic logic which students can utilize to analyze and communicate about financial, real estate, sales, marketing, policy, and entrepreneurship issues in Texas, the nation, and the world. Graduates are trained for a wide variety of jobs in agricultural and nonagricultural oriented businesses, firms, and agencies in both the public and private sectors. Flexibility is included in the curriculum so that a student, in consultation with an academic advisor, can develop a degree program which best fits personal career objectives and could include one or more of the following experiences: industry internship; the Agricultural and Natural Resources Policy Internship program; and research, directed studies, or study abroad opportunities.

Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

Food Marketing Systems Option

The Food Marketing Systems Option is designed to provide a well-founded basis in principles, concepts and methods for students interested in management, marketing, sales and related professional careers in the agricultural industry and/or related professions.

Program Requirements

First Year

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<tr>
<th>Semester Credit Hours</th>
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Fall

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<th>Course Title</th>
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<tr>
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<td>Introduction to Rhetoric and Composition or Rhetoric</td>
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<tr>
<td>MATH 141 or MATH 140</td>
<td>Finite Mathematics or Mathematics for Business and Social Sciences</td>
<td>3</td>
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<tr>
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Total Semester Credit Hours 16

Spring

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<tr>
<td>Creative Arts elective (p. 24)</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
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Total Semester Credit Hours 15

Second Year

Fall

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<tr>
<td>ACCT 209</td>
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<tr>
<td>AGEC 217</td>
<td>Fundamentals of Agricultural Economics Analysis</td>
<td>3</td>
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<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
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<tr>
<td>Government/Political science elective (p. 25)</td>
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Total Semester Credit Hours 15

Spring

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<td>Principles of Economics</td>
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Total Semester Credit Hours 15

Third Year

Fall

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<td>AGEC 315</td>
<td>Food and Agricultural Sales</td>
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<td>Microeconomic Theory</td>
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<td>Statistical Methods</td>
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Total Semester Credit Hours 15

Spring

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<td>AGEC 330</td>
<td>Financial Management in Agriculture</td>
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<tr>
<td>AGEC 340</td>
<td>Agribusiness Management</td>
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</table>
Agricultural Economics - BS, Policy and Economic Analysis Option

The Bachelor of Science degree in Agricultural Economics offers students four options: Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. The course requirements for the freshman and sophomore years are the same for all Agricultural Economics options.

The Agricultural Economics program is designed to assist in the development of skills in agriculture, applied economics, and economic logic which students can utilize to analyze and communicate about financial, real estate, sales, marketing, policy, and entrepreneurship issues in Texas, the nation, and the world. Graduates are trained for a wide variety of jobs in agricultural and nonagricultural oriented businesses, firms, and agencies in both the public and private sectors. Flexibility is included in the curriculum so that a student, in consultation with an academic advisor, can develop a degree program which best fits personal career objectives and could include one or more of the following experiences: industry internship; the Agricultural and Natural Resources Policy Internship program; and research, directed studies, or study abroad opportunities.

Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

Policy and Economic Analysis Option

The Policy and Economic Analysis Option is designed to provide a well-founded basis in principles, concepts and methods for students interested in pursuing graduate study and/or law school following their graduation with a BS degree.

Program Requirements

First Year

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<tr>
<th>Semester</th>
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<th>Course Title</th>
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<td>ENGL 104</td>
<td>or Composition and Rhetoric</td>
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<td>or MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
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<td>Language, philosophy and culture elective (p. 23)</td>
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Second Year

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<tr>
<td>Fall</td>
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<td>Survey of Accounting Principles</td>
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<tr>
<td></td>
<td>AGEC 217</td>
<td>Fundamentals of Agricultural Economics Analysis</td>
<td>3</td>
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<tr>
<td></td>
<td>ECON 202</td>
<td>Principles of Economics</td>
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<td></td>
<td>Government/Political science elective (p. 25)</td>
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<td>Life and physical sciences elective (p. 22)</td>
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<tr>
<td>Spring</td>
<td>ACCT 210</td>
<td>Survey of Managerial and Cost Accounting Principles</td>
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</table>
### Agricultural Economics - BS, Rural Entrepreneurship Option

The Bachelor of Science degree in Agricultural Economics offers students four options: Finance and Real Estate, Food Marketing Systems, Policy and Economic Analysis, and Rural Entrepreneurship. The course requirements for the freshman and sophomore years are the same for all Agricultural Economics options.

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Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog. With the exception of general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

#### Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics 3</td>
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<td>AGEC 106</td>
<td>Microeconomics of Agriculture 3</td>
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<td>AGEC 107</td>
<td>Macroeconomics of Agriculture 3</td>
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<td>AGEC 108</td>
<td>Accounting Principles 3</td>
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<td>AGEC 109</td>
<td>Financial Management in Agriculture 3</td>
</tr>
<tr>
<td>AGEC 110</td>
<td>Agricultural Policy 4</td>
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<td>AGEC 111</td>
<td>Economic Analysis for Agribusiness Management 3</td>
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<td>AGEC 112</td>
<td>Food and Agricultural Price Analysis 3</td>
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<td>AGEC 114</td>
<td>Directed non-agricultural economics elective 5</td>
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<td>AGEC 115</td>
<td>General elective 7</td>
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<td>AGEC 116</td>
<td>Environmental and Natural Resource Economics 3</td>
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<td>AGEC 117</td>
<td>Macroeconomics of Agriculture 3</td>
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<td>AGEC 118</td>
<td>Money and Banking 3</td>
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<td>AGEC 119</td>
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<td>AGEC 120</td>
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<td>AGEC 121</td>
<td>General elective 7</td>
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<td><strong>Total Semester Credit Hours</strong></td>
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1. Students under ROTC contract, see Requirement 7 of the Requirements for a Baccalaureate Degree. (p. 28)
2. Any course offered by the College of Agriculture and Life Sciences, except 285s, 484s, 485s and agricultural economics courses.
3. The 6 hours of international and cultural diversity courses, as required for graduation, may be met in the curriculum. Students may select Language, Philosophy and Culture and Creative Arts elective that also meet the international and cultural diversity requirement.
4. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.
5. Six hours to be selected in one or more departments outside of the Department of Agricultural Economics. A minimum of 3 of these hours must be at the 300- or 400-level. To be selected in consultation with an advisor.
6. To be selected in consultation with an advisor.
7. Any Texas A&M or transfer course (except KINE 198 and KINE 199; STLC 001 - STLC 003 (p. 972)) not used to meet other requirements.
Students whose records are judged to be competitive by the mid-January
website rather than the ApplyTexas application, hence no application fee. We recommend submitting a 2-page application found on the Bush School of Government & Public Service website.

Students in the 3+2 program will submit the same materials (including GRE scores) as other MPSA applicants; the one exception to this is the submission of a 2-page application found on the Bush School website rather than the ApplyTexas application, hence no application fee. Students whose records are judged to be competitive by the mid-January.
deadline will be invited to attend the GBS Interview Conference Weekend in late February/early March. The admissions criteria for the five-year program will be the same as for other MPSA students.

Students who choose not to finish the MPSA degree after being admitted to the five-year program may exit the program at any time. Completed MPSA courses will be applied to their bachelor's degree in Agricultural Economics, and students will select the Agricultural Economics option area that is most appropriate for their interest. Failure to complete the MPSA program will in no way impede their ability to attain a bachelor's degree in Agricultural Economics when the requirements for that degree are completed.

Advising for the five-year program will involve a coordinated effort by the Undergraduate Program Office in the Department of Agricultural Economics and the Director of the MPSA program in the Bush School. Advising by the Department of Agricultural Economics will help ensure that interested students have satisfied the prerequisite course requirements for their bachelor's degree by the beginning of their senior year. The MPSA director and GBS director of recruiting will also be available for Agricultural Economics students who wish to set up appointments to talk individually about the MPSA program's curriculum and career opportunities available to its graduates.

Students in the five-year program will be required to complete the same two-year, 48-hour curriculum as other students admitted to the Bush School's MPSA program.

**Program Requirements**

**First Year**

**Fall**

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<tr>
<th>Course</th>
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<td>American History (p. 25) ²</td>
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**Spring**

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<td>Communication (p. 22)</td>
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**Second Year**

**Fall**

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<td>Fundamentals of Agricultural Economics Analysis ⁴</td>
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<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
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<td>POLS 206</td>
<td>American National Government ²</td>
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**Spring**

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<tr>
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<td>POLS 207</td>
<td>State and Local Government ²</td>
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<tr>
<td>ECON 433</td>
<td>Energy Markets and Policy</td>
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<td>ESSM 406</td>
<td>Natural Resources Policy</td>
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<td>FSTC 444</td>
<td>Fundamentals of Food Law</td>
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<td>GEOG 330</td>
<td>Resources and the Environment or Environmental Justice</td>
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<td>GEOG 430</td>
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<td>GEOS 430</td>
<td>Global Science and Policy Making</td>
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<td>MKTG 409</td>
<td>Principles of Marketing</td>
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<td>POLS 340</td>
<td>Introduction to Public Administration</td>
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<td>POLS 364</td>
<td>Global Political Thought</td>
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<td>POLS 415</td>
<td>Contemporary Issues in American Foreign Policy</td>
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**Third Year**

**Fall**

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<td>AGEC 330</td>
<td>Financial Management in Agriculture</td>
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<td>AGEC 340</td>
<td>Agribusiness Management</td>
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<tr>
<td>AGEC 429</td>
<td>Agricultural Policy ⁴</td>
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<td>International Trade and Agriculture or AGEC 453</td>
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**Spring**

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<tbody>
<tr>
<td>AGEC 317</td>
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<td>AGEC 344</td>
<td>Food and Agricultural Law</td>
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<tr>
<td>AGEC 350</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
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<tr>
<td>AGEC 430</td>
<td>Macroeconomics of Agriculture or Money and Banking</td>
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</table>
AGRIC 481  Ethics in Agribusiness and Agricultural Economics  1
Directed agricultural economics elective  3

Semester Credit Hours  16

Summer
Directed non-agricultural economics elective  3
Select one from the following:
ECMT 461  Economic Data Analysis
ECON 433  Energy Markets and Policy
ESSM 406  Natural Resources Policy
FSTC 444  Fundamentals of Food Law
GEOG 330  Resources and the Environment
or  Environmental Justice
GEOG 430  Global Science and Policy Making
MKTG 409  Principles of Marketing
POLS 340  Introduction to Public Administration
POLS 364  Global Political Thought
POLS 412  International Political Economy
POLS 415  Contemporary Issues in American Foreign Policy
POLS 439  Foreign Policy Decision Making
POLS 440  Public Policies and Policymaking
POLS 447  National Security Policy
or  Government and the Economy
POLS 475  Public Policies and Policymaking
URPN 360  Issues in Environmental Quality
WGST 430/ MGMT 430  Employment Discrimination Law

Semester Credit Hours  3

Fourth Year
Fall
General Electives  14
BUSH 631  Quantitative Methods in Public Management I
PSAA 601  Foundations of Public Service
PSAA 621  Economic Analysis
or  Foundations of Microeconomic Theory
ECON 607  Theory
PSAA 622  Public Finance
PSAA 635  Social Welfare and Health Policy

Semester Credit Hours  14

Spring
AGRIC elective 600-level  3
Select one of the following:
AGEC 604/  Natural Resource Economics
PSAA 663  Global Food and Agribusiness Policy
AGEC 606  Water Resource Economics
AGEC 607  Research Methodology
AGEC 610  Economics of Biosecurity
AGEC 614  Global Food and Agribusiness Policy
AGEC 633  Sustainability in World Development
AGEC 652  International Agribusiness Trade Analysis

Semester Credit Hours  3

Summer
Professional Internship

Semester Credit Hours  0
Total Semester Credit Hours  120

Fifth Year
Fall
PSAA 611  Public Policy Formation  3
PSAA 675  Public Service and Administration Capstone Seminar  3
Elective 600-level  6
One approved PSAA Elective  3

Semester Credit Hours  15

Spring
PSAA 615  Policy Analysis  3
PSAA 676  Public Service and Administration Capstone Seminar II  3
Elective 600-level  9

Semester Credit Hours  15
Total Semester Credit Hours  30

1 This course meets the Social and Behavioral Sciences requirement.
2 Completion of four semesters of upper-level ROTC may be substituted for 3 hours of American History and 3 hours of Government/Political Science. Students under ROTC contract, see Requirement 7 of the Requirements for Baccalaureate Degree. (p. 28)
3 The 6 hours of International and Cultural Diversity (p. 40) credits, as required for graduation, may be met in the curriculum. Students may select a Language, Philosophy and Culture elective, and a Creative Arts elective, that also meet the International and Cultural Diversity (p. 40) requirement.
4 All undergraduate students must take at least two courses in their major designated as writing intensive (W). This course is an approved W course.
5 To be selected in consultation with an advisor.

The program includes a total of 150 hours with 17 hours being applied toward both the B.S. in AGEC and the MPSA (14 hours of general electives and 3 hours of 600-level AGEC coursework).

Agribusiness Entrepreneurship - Minor

The Agribusiness Entrepreneurship Minor is for students who are interested in starting their own business; working in an existing family-owned business; working for an entrepreneur; pursuing employment with a bank or financial institution; or wanting a working knowledge of business development practices and strategies.

Students will choose to develop a business plan for their own professional career pursuit, or to evaluate a business from an investor’s or consultant’s perspective in the coursework included in this minor. Your business venture and business setting will be selected, and mutually agreed on, between the instructor and the student. The options
for your business are wide and varied, and your business can be located in either a rural or metropolitan setting.

A critical ingredient in the Agribusiness Entrepreneurship Minor is learning to establish and develop a large network with successful entrepreneurs and other professionals. This minor offers ample opportunities for you to learn how to develop networking strategies in the classroom and in social settings.

Innovation and entrepreneurship are not limited to one field/degree area; therefore, the Agribusiness Entrepreneurship Minor is open to all majors. Students must have a cumulative GPR of 2.0 or higher to be approved to pursue the minor. Students must earn a grade of “C” or better in all required minor coursework.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEC 315</td>
<td>Food and Agricultural Sales</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 424</td>
<td>Agribusiness Entrepreneurship – Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 425</td>
<td>Agribusiness Entrepreneurship – Financial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 434</td>
<td>Rural Financial Markets and Financial Planning</td>
<td>3</td>
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</tbody>
</table>

Select one from the following:

AGEC 223 Establishing Agribusiness Entrepreneurship Networks I

AGEC 423 Establishing Agribusiness Entrepreneurship Networks II

Select one from the following:

AGEC 324 Agribusiness Entrepreneurship – Budgeting

MGMT 461 Entrepreneurship and New Ventures

MGMT 470 Entrepreneurial Small Business

MGMT 477 Entrepreneurship: The Lean Startup Approach

MGMT 489 Special Topics in... ¹

Total Semester Credit Hours 16

¹ Must be taken as MGMT 489 Innovative Product Design: The Lean Startup Method.

Students must have a cumulative GPR of 2.0 or higher.

### AgriFood Sales - Minor

#### Overview

The Department of Agricultural Economics offers an AgriFood Sales Minor.

#### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEC 216</td>
<td>Fundamentals of the AgriFood Sales Industry</td>
<td>1</td>
</tr>
<tr>
<td>AGEC 315</td>
<td>Food and Agricultural Sales</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 316</td>
<td>Building Customer Relationships in AgriFood Selling</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 416</td>
<td>Sales Management and Advanced Techniques in Professional Technical Selling for AgriFood Firms</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

AGEC 314 Marketing Agricultural and Food Products

MKTG 321 Marketing

MKTG 409 Principles of Marketing

Select one of the following:

AGEC 330 Financial Management in Agriculture

AGEC 340 Agribusiness Management

AGEC 422 Land Economics

AGEC 424 Agribusiness Entrepreneurship – Economic Analysis

¹ The following courses will not count toward the 6 hours of electives: AGEC 481, AGEC 484, and AGEC 485. Students are encouraged to visit the Agricultural Economics advisors to select the elective courses based on their career interests.

Students must make a grade of “C” or better in all courses.

### Agricultural Economics - Minor

The minor in Agricultural Economics is available to all students enrolled at Texas A&M University. The primary educational objective of this minor program is to provide students, majoring in other fields, with a fundamental knowledge of the fields of agricultural economics. The courses required for this minor will cover the major business elements of the agricultural industry.
Financial Planning - Minor

The minor in Financial Planning prepares students for leadership roles in this growing profession. Financial planners advise their clients about financial decisions, including budget management, insurance, investment, taxes, retirement and estate planning. Their goal is to assist clients in achieving their financial goals in an increasingly complex economy. The six-course curriculum (18 credit hours) also satisfies the educational requirements to be eligible to sit for the exam portion of the CERTIFIED FINANCIAL PLANNER™ (CFP®) designation conferred by the CFP Board of Standards (http://www.cfp.net). Professionals who have earned this designation are in high demand in the financial services sector.

The minor in Financial Planning is available to all junior or senior undergraduate students enrolled at Texas A&M University, who have completed an introductory finance course and have an overall GPA of 2.5 or higher. Successful completion of the minor requires the courses to be taken for academic credit with a grade of C or better for each course. Coursework is offered both online and in the classroom to meet students' learning preferences. Visit our website (http://financialplanning.tamu.edu) for more information about this minor and the career opportunities in Financial Planning.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE 435</td>
<td>Financial Planning for Professionals</td>
<td>3</td>
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<tr>
<td>AGE 436</td>
<td>Insurance and Estate Planning</td>
<td>3</td>
</tr>
<tr>
<td>AGE 437</td>
<td>Tax Planning</td>
<td>3</td>
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<tr>
<td>AGE 438</td>
<td>Investment Planning</td>
<td>3</td>
</tr>
<tr>
<td>AGE 439</td>
<td>Retirement Planning</td>
<td>3</td>
</tr>
<tr>
<td>AGE 441</td>
<td>Financial Planning Capstone</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>18</td>
</tr>
</tbody>
</table>

Students must make a grade of "C" or better in all courses.

Students must have a declared major.

Must meet all prerequisite requirements for each course listed prior to enrolling in the course.

Must have a cumulative GPR of 2.0 or higher.

Must must earn a grade of "C" or better in each required course.

International Trade and Agriculture - Certificate

Open to All Majors

The Certificate in International Trade and Agriculture (CITA), offered by the Department of Agricultural Economics, is designed to provide students with a complete knowledge and understanding of the global forces shaping change in agriculture. The CITA is available to all students provided that all prerequisites are met. The program requires a minimum of 15 credit hours in designated courses. Also, students must earn a grade of "C" or better in each course used to meet CITA requirements. Students who pursue the CITA must complete all requirements prior to graduation. Specific certificate requirements are available in the Undergraduate Programs Office, Room 214 of the Agriculture and Life Sciences Building, of the Department of Agricultural Economics or at http://agecon.tamu.edu/undergraduate/current-students/curriculum/certificate/
Study abroad, foreign languages, and international internships are encouraged and allowed to contribute toward the 15 hours required for the certificate. No more than three hours of foreign language or six hours of study abroad or six hours of international internship may be counted as credit toward the certificate.

Department of Agricultural Leadership, Education, and Communications

The Department of Agricultural Leadership, Education, and Communications (ALEC) includes a student-centered faculty and staff offering undergraduate and graduate degrees leading to professional careers. Undergraduate programs in ALEC offer a unique combination of practical, hands-on skills and the critical people skills required for success in today's fast-moving careers. ALEC graduates are uniquely equipped for leadership, education, communications, and training roles in the broad field of agricultural sciences and human performance in both domestic and international settings. ALEC offers four Bachelor of Science degrees: Agricultural Communications and Journalism, Agricultural Leadership and Development, Agricultural Science, and University Studies-Leadership Studies; and three minors: Agricultural Communications and Journalism, International Agricultural Development, and Leadership.

Faculty

Archer, Holli R, Assistant Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2013

Boyd, Barry L, Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1991

Briers, Gary E, Professor
Ag Leadership, Educ & Comm
PHD, Iowa State University, 1978

Cummings, Scott, Professor & Extension Specialist
Ag Leadership, Educ & Comm
DPH, The University of Texas Health Science Center at Houston, 1995

Dooley, Kim E, Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1995

Dromgoole, Darrell, Associate Professor & Extension Specialist
Ag Leadership, Educ & Comm
DED, Texas A&M University, 2007

Dunsford, Deborah W, Senior Lecturer
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1993

Edney, Kirk C, Instructional Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2009

Elbert, Chanda D, Associate Professor
Ag Leadership, Educ & Comm
PHD, The Pennsylvania State University, 2000

Elliot, John F, Professor
Ag Leadership, Educ & Comm
PHD, The Ohio State University, 1988

Felton Odom, Summer R, Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2011

Hanagriff, Roger D, Instructional Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2002

Hancock, Jay P, Assistant Lecturer
Ag Leadership, Educ & Comm
MS, Texas A&M University, 1984

Harlin, Julie F, Associate Professor
Ag Leadership, Educ & Comm
PHD, Oklahoma State University, 1999

McKim, Billy R, Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2010

Moore, Lori L, Associate Professor
Ag Leadership, Educ & Comm
PHD, University of Florida, 2003

Murphey, Theresa P, Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1997

Murphy, Timothy H, Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1995

Pina, Manuel, Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1978

Preston, Tammie M, Assistant Lecturer
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2014

Redwine, Tobin D, Assistant Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2014

Ripley, Jeffrey, Assistant Professor & Extension Specialist
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2008

Rutherford, Tracy A, Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1998

Shackelford, Philip, Assistant Professor & Extension Specialist
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 2014
Strong Jr, Robert L, Associate Professor  
Ag Leadership, Educ & Comm  
PHD, University of Florida, 2010

Strong, Jennifer R, Associate Professor  
Ag Leadership, Educ & Comm  
PHD, Oklahoma State University, 2007

Wingenbach, Gary J, Professor  
Ag Leadership, Educ & Comm  
PHD, Iowa State University, 1995

## Majors

- Bachelor of Science in Agricultural Communications and Journalism (p. 132)
- Bachelor of Science in Agricultural Leadership and Development (p. 133)
- Bachelor of Science in Agricultural Science (p. 134)
- Bachelor of Science in University Studies, Leadership Studies Concentration (p. 135)

## Minors

- Agricultural Communications and Journalism Minor (p. 135)
- Extension Education Minor (p. 136)
- International Agricultural Development Minor (p. 136)
- Leadership Minor (p. 136)

## Agricultural Communications and Journalism - BS

Curriculum in Agricultural Communications and Journalism is administered by the Department of Agricultural Leadership, Education, and Communications. Graduates are employed by agricultural businesses, industries and associations; by agriculture-related organizations; by government agencies at all levels; and by all types of communication media: magazines, the Internet, television and radio stations, newspapers, and public relations and advertising agencies.

Students who wish to develop specific career plans may do so in consultation with their Agricultural Communications and Journalism advisor. With approval of the advisor and the dean’s office, substitutions may be made in the required scientific and technical agriculture courses to help meet the student’s goals.

Students are expected to be proficient in the use of computer keyboards for writing.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGCJ 105</td>
<td>Introduction to Agricultural Communications</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 281</td>
<td>Journalism Concepts for Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 307</td>
<td>Design for Agricultural Media</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 312</td>
<td>Editing for Agricultural Audiences</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 313</td>
<td>Agricultural Media Writing I</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 314</td>
<td>Agricultural Media Writing II</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 481</td>
<td>Senior Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

### Agricultural Communications and Journalism Core electives  6

Select two of the following:
- AGCJ 305 Theory and Practice of Agricultural Publishing
- AGCJ 306 Theory and Practice of Agricultural Public Relations
- AGCJ 308 Agricultural Photography
- AGCJ 366 Radio Broadcasting
- AGCJ 380 Workshop in Agricultural Communications and Journalism

### Agricultural Communications and Journalism Professional Skills  9

Select three of the following:
- AGCJ 404 Communicating Agricultural Information to the Public
- AGCJ 405 Agricultural Publications Production
- AGCJ 406 Agricultural Public Relations Methods
- AGCJ 407 Web Authoring in Agricultural Communication
- AGCJ 409 Television Production for Agricultural Journalists
- AGCJ 413 Emerging Media in Agriculture
- AGCJ 466 Advanced Radio Broadcasting
- AGCJ 485 Directed Studies
- AGCJ 494 Internship

### Agricultural business directed elective  3

Select one of the following:
- AGEC 105 Introduction to Agricultural Economics
- AGEC 314 Marketing Agricultural and Food Products
- AGEC 315 Food and Agricultural Sales
- AGEC 340 Agribusiness Management

### Animal science directed elective  3

Select one of the following:
- ANSC 107 General Animal Science
- ANSC 108 General Animal Science
- DASC 202 Dairying
- ENTO 201 General Entomology
- ENTO 208 Veterinary Entomology
- POSC 201 General Avian Science
- WFSC 301 Wildlife and the Changing Environment
- WFSC 304 Wildlife and Fisheries Conservation

### Plant science directed elective  3

Select one of the following:
- SCSC 105 World Food and Fiber Crops
- SCSC 302 Recreational Turf
- HORT 301 Garden Science
- PLPA 301 Plant Pathology
- ESSM 203 Forest Trees of North America
- ESSM 301 Wildland Watershed Management
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ALEC 201</td>
<td>Foundations of Agricultural Leadership, Education and Communications</td>
<td>2</td>
</tr>
<tr>
<td>ALEC 202</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALEC 301</td>
<td>Personal Leadership Education</td>
<td>3</td>
</tr>
<tr>
<td>ALEC 340</td>
<td>Survey of Leadership Theory</td>
<td>3</td>
</tr>
<tr>
<td>ALEC 424</td>
<td>Applied Ethics in Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALEC 440</td>
<td>Leading Change</td>
<td>3</td>
</tr>
<tr>
<td>ALEC 481</td>
<td>Seminar</td>
<td>3</td>
</tr>
<tr>
<td>ALED 202</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>ALED 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>ALED 340</td>
<td>Survey of Leadership Theory</td>
<td>3</td>
</tr>
<tr>
<td>ALED 440</td>
<td>Leading Change</td>
<td>3</td>
</tr>
<tr>
<td>ALED 481</td>
<td>Seminar</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 411</td>
<td>Audience and Communications Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 107</td>
<td>General Animal Science</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 108</td>
<td>General Animal Science</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 202</td>
<td>Dairying</td>
<td>3</td>
</tr>
<tr>
<td>ENTO 201</td>
<td>General Entomology</td>
<td>3</td>
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<tr>
<td>ENTO 208</td>
<td>Veterinary Entomology</td>
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<tr>
<td>POSC 201</td>
<td>General Avian Science</td>
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</tr>
<tr>
<td>POSC 302</td>
<td>Avian Science Laboratory</td>
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<tr>
<td>WFSC 304</td>
<td>Wildlife and Fisheries Conservation</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 411</td>
<td>Audience and Communications Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 320</td>
<td>Animal Nutrition and Feeding</td>
<td>3</td>
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<tr>
<td>FSTC 201</td>
<td>Food Science</td>
<td>3</td>
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<tr>
<td>NUTR 202</td>
<td>Fundamentals of Human Nutrition</td>
<td>3</td>
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<td>STAT 201-STAT 225 (p. 970)</td>
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<tr>
<td>STAT 301-STAT 415 (p. 970)</td>
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<td>6</td>
</tr>
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</table>

Total Semester Credit Hours: 120

1. All agricultural electives will be used to develop a cohesive career emphasis and are to be selected in consultation with an advisor.

The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement.

Agricultural Leadership and Development - BS

Agricultural Leadership and Development is administered by the Department of Agricultural Leadership, Education, and Communications. It prepares students to work with people involved in agriculture and life sciences. The curriculum emphasizes the development of leadership capabilities, communication skills, and broad preparation in life sciences. The curriculum in agricultural leadership and development is multidisciplinary, designed to develop students for leadership positions in local, state, regional, and national groups, organizations, and agencies that are involved in the agricultural industry. The degree requires a 15-18 hour university approved minor that serves as a context for students to apply their leadership knowledge.

1. Before registering as a junior, each student must develop a degree program in consultation with the departmental advisor.

2. All electives must be selected from degree plan options.

3. ALED courses may not be used for these electives.
Students are required to make a C or better for each of their courses in the major coursework area.

At least 36 credits must be 300- and 400-level courses.

Graduation requirements include a requirement for six hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement or a free elective can be used to satisfy this requirement.

**Agricultural Science - BS**

The Agricultural Science curriculum is designed to offer the student a combination of courses in scientific agriculture and in professional education that will meet requirements for employment and advanced study in different careers in which the emphasis is on formal and informal programs of education. Such careers may include teaching agriculture, food, and natural resources in high schools; working as an agricultural extension agent; working as an agricultural representative for a marketing agency, an agricultural supply company or other industries related to agriculture; and serving as an agricultural development consultant in an international program.

A student majoring in agricultural science will be counseled by an advisor in the Department of Agricultural Leadership, Education, and Communications to ensure that the program developed with the student will satisfy his or her unique interests, needs and professional aspirations. A combination of courses in scientific agriculture, education and general studies provides students with a knowledge of scientific agriculture and the ability to work with and influence people. Flexibility in course selection allows a student to place emphasis on a particular field of agriculture or to prepare broadly in agricultural studies. This flexibility will prepare a student to teach in a particular school setting, focusing upon a certain curriculum (e.g., mechanical systems, horticulture, animal science, or agricultural business).

Many aspects of the practice of agriculture are learned through experience. Enrollment in high school agricultural science and participation in FFA and/or 4-H are encouraged and recommended, but not required.

A student following this curriculum may be eligible to enter public schools as a teacher of agriculture food and natural resource under the Texas Education Agency. An off-campus professional teaching internship is required.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics or Principles of Economics</td>
<td>3</td>
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<tr>
<td>AGEC 120</td>
<td>Animal Nutrition and Feeding</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 202</td>
<td>Reproduction in Farm Animals</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 203</td>
<td>Livestock Practicum</td>
<td>3</td>
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</table>

Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>AGEC 314</td>
<td>Marketing Agricultural and Food Products</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 315</td>
<td>Food and Agricultural Sales</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 325</td>
<td>Principles of Farm and Ranch Management</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 340</td>
<td>Agribusiness Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 481</td>
<td>Seminar</td>
<td>2</td>
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<tr>
<td>AGSC 484</td>
<td>Field Experience</td>
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</table>

Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ANSC 107</td>
<td>General Animal Science</td>
<td>3</td>
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<tr>
<td>DASC 202</td>
<td>Dairying</td>
<td>3</td>
</tr>
<tr>
<td>POSC 201</td>
<td>General Avian Science</td>
<td>3</td>
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<tr>
<td>ANSC 320</td>
<td>Animal Nutrition and Feeding</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 433</td>
<td>Reproduction in Farm Animals</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 484</td>
<td>Livestock Practicum</td>
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</tr>
<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
<td>2</td>
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<tr>
<td>INST 301</td>
<td>Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 105</td>
<td>World Food and Fiber Crops</td>
<td>3</td>
</tr>
</tbody>
</table>

or HORT 201 or Horticultural Science and Practices

American history electives (p. 25) 6
Biological and agricultural engineering/Agricultural systems management electives 3
Communication electives (p. 22) 3
Creative art elective (p. 24) 3
Language, philosophy and culture elective (p. 23) 3
Life and physical sciences electives (p. 22) 9
Mathematics electives (p. 22) 6
Plant science electives 4
Scientific agriculture electives 3
Electives 3

Total Semester Credit Hours 120

---

1 Must make a grade of ‘C’ or better to receive credit.
2 Professional development courses required for certification as a teacher of agricultural science.
3 In order to be eligible for student teaching, the AGSC major requires a 2.75 GPA.
4 Restricted electives in scientific agriculture are required for teacher certification by the Texas Education Agency. A minimum of 24 semester hours of scientific agriculture must be at the 300- and 400-level.
The Graduation requirements include a requirement for six hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement.

### University Studies - BS, Leadership Studies Concentration

A University Studies Degree is an interdisciplinary major that consists of a concentration of 26 hours and two minors of 15-18 hours each. The University Studies Degree format was created to provide students the flexibility to combine areas of study that are of special interest. University Studies - Leadership Studies is administered by the Department of Agricultural Leadership, Education, and Communications. In the leadership studies concentration, students learn theories and models of the leadership process and they use analysis and evaluation to synthesize multiple leadership theories. This interdisciplinary program allows you the ability to customize your higher educational experience to your future career goals unlike any other degree at Texas A&M University. This innovative degree empowers you to develop an understanding of foundational leadership theory in your chosen context. The student, with support from the advisor, will choose minors to assist them in creating a degree plan that will allow students to gain the knowledge and skills required for their chosen career path.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALEC 201</td>
<td>Foundations of Agricultural Leadership, Education and Communications</td>
<td>2</td>
</tr>
<tr>
<td>ALED 202</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALED 301</td>
<td>Personal Leadership Education</td>
<td>3</td>
</tr>
<tr>
<td>ALED 340</td>
<td>Survey of Leadership Theory</td>
<td>3</td>
</tr>
<tr>
<td>ALED 424</td>
<td>Applied Ethics in Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALED 440</td>
<td>Leading Change</td>
<td>3</td>
</tr>
<tr>
<td>ALED 481</td>
<td>Seminar</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Agricultural leadership and development electives</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>(p. 715)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>&amp; POLS 207 and State and Local Government Communication (p. 22)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Creative arts (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics (p. 22)</td>
<td>6</td>
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<tr>
<td></td>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Minor 1</td>
<td></td>
<td>15-18</td>
</tr>
<tr>
<td>Minor 2</td>
<td></td>
<td>15-18</td>
</tr>
<tr>
<td>Electives</td>
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<td>16-22</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>

Students must make a grade of “C” or better in all courses.

1. Before registering as a junior, each student must develop a degree program in consultation with the departmental advisor.

2. The total number of hours between Minor 1, Minor 2 and electives must be 53 hours. Courses counting in other areas of the degree plan and toward a minor cannot count toward the 53 total hours. Must meet with an advisor to determine correct hours.

### Agricultural Communications and Journalism - Minor

Students in the College of Agriculture and Life Sciences seeking a minor in Agricultural Communications and Journalism should begin the process by discussing the option with their academic advisor in their major. Students should then make an appointment with an advisor in Agricultural Communications and Journalism to discuss their interests. An application is required for establishing a minor in Agricultural Communications and Journalism.

Agricultural Communications and Journalism is highly focused on written communication. Interested students should consider their interest in writing before beginning the minor.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGCJ 105</td>
<td>Introduction to Agricultural Communications</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 307</td>
<td>Design for Agricultural Media</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 312</td>
<td>Editing for Agricultural Audiences</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 313</td>
<td>Agricultural Media Writing I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 305</td>
<td>Theory and Practice of Agricultural Publishing</td>
<td></td>
</tr>
<tr>
<td>AGCJ 306</td>
<td>Theory and Practice of Agricultural Public Relations</td>
<td></td>
</tr>
<tr>
<td>AGCJ 314</td>
<td>Agricultural Media Writing II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 405</td>
<td>Agricultural Publications Production</td>
<td></td>
</tr>
<tr>
<td>AGCJ 406</td>
<td>Agricultural Public Relations Methods</td>
<td></td>
</tr>
<tr>
<td>AGCJ 407</td>
<td>Web Authoring in Agricultural Communication</td>
<td></td>
</tr>
<tr>
<td>AGCJ 411</td>
<td>Audience and Communications Research Methods</td>
<td></td>
</tr>
<tr>
<td>AGCJ 413</td>
<td>Emerging Media in Agriculture</td>
<td></td>
</tr>
<tr>
<td>AGCJ 466</td>
<td>Advanced Radio Broadcasting</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

Students must make a grade of “C” or better in all courses.
Extension Education - Minor

The undergraduate Minor in Extension Education (EXED) provides students with formal instruction in Extension Education necessary to be successful Extension educators. The 18 hour curriculum prepares students in the history and philosophy of Extension education, extension educational methodologies, program management and program development. Students explore Extension educational roles in their future contexts; develop an awareness of program development, volunteer management, Extension educational theories and models for future application as an Extension educator. The coursework includes nine credits of foundation leadership concepts, three credit hours in a specialized area of leadership, and three hours in an Extension internship.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALED 339</td>
<td>Agricultural Extension Philosophy and the Land-Grant Mission</td>
<td>3</td>
</tr>
<tr>
<td>ALED 441</td>
<td>Agricultural Extension Organization and Methods</td>
<td>3</td>
</tr>
<tr>
<td>ALED 494</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three from:

- ALED 341 Team Learning
- ALED 344 Leadership of Volunteers
- ALED 426 Leading and Training Adult Learners
- ALED 440 Leading Change
- ALED 442 Professional Communications in Agriculture and Life Sciences
- ALEC 412 Technology-Enhanced Instructional Design Strategies for Agriculture
- ALEC 425 Principles of Program Evaluation
- RPTS 308 Foundations of Community and Community Development
- RPTS 370 Youth Development Organizations and Services
- RPTS 371 Understanding and Developing Effective Skills for Youth Development
- RPTS 408 Community Development and Supporting Institutions
- RPTS 478 Youth Development Practice

Total Semester Credit Hours 18

Minimum of 6 hours at 300- to 400-level.

International Agricultural Development - Minor

The minor in International Agricultural Development provides students with formal instruction in international development concepts and practical experiences through language acquisition, study/research abroad, and/or international fieldwork. The 18-hour curriculum prepares students for successful post-baccalaureate international careers, interdisciplinary studies, graduate studies. Students critically examine current international agricultural issues and/or diversity and communications. Coursework includes 12 credits of foundational concepts and six hours of upper-division foreign languages or approved international experiences. Students must have a declared major, a GPR of 2.0 or higher, and have completed less than 75 hours at time of application. Before being accepted into the minor, students must meet with an IDAG advisor and complete an online application.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>AGCJ 491</td>
<td>Research</td>
<td>3</td>
</tr>
<tr>
<td>Select three of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALEC 350</td>
<td>Global Agricultural Issues</td>
<td></td>
</tr>
<tr>
<td>ALEC 450</td>
<td>Global Social Justice Issues in Agriculture</td>
<td></td>
</tr>
<tr>
<td>ALED 422</td>
<td>Cultural Pluralism in Agriculture</td>
<td></td>
</tr>
<tr>
<td>ALED 442</td>
<td>Professional Communications in Agriculture and Life Sciences</td>
<td></td>
</tr>
<tr>
<td>Practical Skills/Experiences: Upper-division, university-level foreign languages; or IDAG advisor approved international experiences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must have completed less than 75 hours and have a minimum GPA of 2.0 or higher.

Leadership - Minor

The minor in leadership studies provides students with formal instruction of leadership theory and practices necessary to be successful leaders in future career roles. The 15-hour curriculum prepares students to be effective industry, community, and organization leaders. Students explore leadership roles in their future contexts, develop an awareness of personal leadership characteristics, and apply leadership theories and models to future professional experiences. The coursework includes 9 credits of foundational leadership concepts, 3 credit hours in a specialized area of leadership, and 3 hours in a capstone seminar.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALED 202</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALED 301</td>
<td>Personal Leadership Education</td>
<td>3</td>
</tr>
<tr>
<td>ALED 340</td>
<td>Survey of Leadership Theory</td>
<td>3</td>
</tr>
<tr>
<td>ALED 481</td>
<td>Seminar</td>
<td>3</td>
</tr>
<tr>
<td>Directed elective</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- ALED 341 Team Learning
- ALED 342 Learning Organizations
- ALED 344 Leadership of Volunteers
- ALED 380 Workshop in Agricultural Leadership and Development
- ALED 400 Public Leadership Development
- ALED 424 Applied Ethics in Leadership
- ALED 440 Leading Change

Total Semester Credit Hours 15
Department of Animal Science

The curricula in Animal Science are designed to prepare students for rewarding careers in animal-oriented agribusiness. The millions of domestic animals that provide food, fiber and recreation for humans offer a variety of career opportunities for animal science graduates.

Students completing the Bachelor of Science degree in Animal Science are in demand by both the private and public sectors. Career paths include livestock production and the extensive infrastructure that provides the products and services required for management, marketing and processing of livestock and livestock products. Students receive training in nutrition, breeding, reproductive physiology, meat science, dairy products, wool and mohair, and the production and management of livestock. Extensive laboratory facilities and livestock operations located on or near campus in the Animal Science Teaching, Research and Extension Complex facilitate practical application of the scientific principles.

Leadership skills are developed through participation in a wide array of extracurricular activities, including departmental clubs, judging teams and continuing education/youth programs. A substantial number of students gain experience in a variety of disciplines through high impact learning experiences such as internships, research, study abroad and field trips.

Faculty

Bazer, Fuller W, Distinguished Professor
Animal Science
PHD, North Carolina State University, 1969

Carstens, Gordon E, Professor
Animal Science
PHD, Colorado State University, 1998

Castillo, Alejandro, Associate Professor
Animal Science
PHD, Texas A&M University, 1998

Collins, Haley C, Lecturer
Animal Science
MS, Sam Houston State University, 2015

Cross, H Russell, Professor
Animal Science
PHD, Texas A&M University, 1972

Daigle, Courtney L, Assistant Professor
Animal Science
PHD, Michigan State University, 2013

De Carvalho Cardoso, Rodolfo, Assistant Professor
Animal Science
PHD, Texas A&M University, 2014
DVM, Sao Paulo State University, 2005

Dunlap, Kathrin A, Assistant Professor
Animal Science
PHD, Texas A&M University, 2006

Forrest, David W, Professor
Animal Science
PHD, University of Wyoming, 1979

Garcia, Leslie L, Instructional Assistant Professor
Animal Science
PHD, Texas A&M University, 2015

Gehring, Kerri B, Professor
Animal Science
PHD, Texas A&M University, 1994

Gill, Clare, Professor
Animal Science
PHD, University of Adelaide, Australia, 2000

Gill, Jason J, Assistant Professor
Animal Science
PhD, University of Guelph, 2006

Heird, James C, Executive Professor
Animal Science
PHD, Texas Tech University, 1978

Herring, Andy D, Professor
Animal Science
PHD, Texas A&M University, 1994

Ing, Nancy H, Professor
Animal Science
PHD, University of Florida, 1988

Kerth, Christopher R, Associate Professor
Animal Science
PHD, Texas Tech University, 1999

Lamb, Graham C, Professor
Animal Science
PHD, Kansas State University, 1998

Leatherwood, Jessica L, Assistant Professor
Animal Science
PHD, Texas A&M University, 2013

Mies, William L, Visiting Professor
Animal Science
PHD, University of Missouri - Columbia, 1971

Miller, Rhonda K, Professor
Animal Science
PHD, Colorado State University, 1983

Osburn, Wesley N, Associate Professor
Animal Science
PHD, University of Nebraska–Lincoln, 1996

Ramsey, W S, Professor
Animal Science
PHD, New Mexico State University, 1996

Riggs, Penny K, Associate Professor
Animal Science
PHD, Texas A&M University, 1996

\(^1\) Or other advisor approved ALED (p. 715) elective
Riley, David G, Professor
Animal Science
PHD, Texas A&M University, 2000

Sanders, James O, Professor
Animal Science
PHD, Texas A&M University, 1977

Satterfield, Michael C, Associate Professor
Animal Science
PHD, Texas A&M University, 2008

Savell, Jeffrey W, Professor
Animal Science
PHD, Texas A&M University, 1978

Sawyer, Jason E, Associate Professor
Animal Science
PHD, New Mexico State University, 2000

Skaggs, Chris L, Professor
Animal Science
PHD, Iowa State University, 1992

Smith, Gary C, Visiting Professor
Animal Science
PHD, Texas A&M University, 1968

Smith, Stephen B, Professor
Animal Science
PHD, University of California, Davis, 1980

Taylor, Thomas M, Associate Professor
Animal Science
PHD, University of Tennessee, 2006

Tedeschi, Luis O, Professor
Animal Science
PHD, Cornell University, 2001

Tomaszewski, Michael A, Visiting Professor
Animal Science
PHD, North Carolina State University, 1972

Vogelsang, Martha M, Senior Lecturer
Animal Science
PHD, Texas A&M University, 1986

Welsh, Thomas H, Professor
Animal Science
PHD, North Carolina State University, 1980

White, Sarah H, Assistant Professor
Animal Science
PHD, University of Florida, 2014

Wickersham, Tryon A, Associate Professor
Animal Science
PHD, Kansas State University, 2006

Wu, Guoyao, Professor
Animal Science
PHD, University of Alberta, Canada, 1989

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**Majors**

- Bachelor of Science in Animal Science, Production/Industry Option (p. 138)
- Bachelor of Science in Animal Science, Science Option (p. 140)

**Certificates**

- Equine Science Certificate (p. 141)
- Meat Science Certificate (p. 141)

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**Animal Science - BS, Production/Industry Option**

This curriculum prepares students for careers in animal-oriented agribusinesses. Other courses, in addition to animal science courses, include marketing, economics, genetics and management. A wide array of internships giving students invaluable experience in all phases of livestock production and related industries is available. Career opportunities include sales, management, public relations, marketing, quality control and education. Students may concentrate on an emphasis area within this option, including the following.

**Beef Cattle**

Students receive training that enables them to pursue careers in ranch management, feedlot management, pharmaceutical sales and other service-oriented livestock industries. Students are trained in all aspects of production, marketing and merchandising techniques for employment in the beef industry. The University Beef Cattle Center gives students hands-on experience.

**Dairy**

The focus of this emphasis area is to develop a well-rounded, knowledgeable student. Students have the opportunity to apply scientific principles, problem-solving methods, state-of-the-art techniques and information transfer to complex dairy production systems.

**Equine**

Designed for students with professional or vocational interests in horses and the horse industry. Coursework emphasizes equine nutrition, breeding, reproduction, health, management, training and judging. Lectures are reinforced with laboratories in which students work with horses. Graduates are well prepared for careers with horse production farms, stallion stations, performance and race training stables, breed associations, performance horse organizations, feed and pharmaceutical companies, county extension positions, and other industries and agencies related to the horse industry.

**Meat**

Students prepare for a career in the meats industry by taking meat science and processing and evaluation courses. Students also can conduct research through special problems courses and can gain valuable work experience on campus in the Meat Science Section or the Rosenthal Meat Science and Technology Center or off campus through internships or summer jobs. Job opportunities are available in packing, processing, retailing, purveying, food service, promotion, public relations and government regulatory agencies.
Sheep

Designed to prepare students for careers in the sheep and goat industries and in the associated wool and mohair industries, this emphasis gives students first-hand experience in sheep production and management practices, as well as procedures for processing and evaluating fleeces. Job opportunities are diverse and include flock management, marketing of lamb and fiber products, feed and pharmaceutical sales and county extension agent positions.

Swine

This emphasis area is designated for students planning to pursue a career in swine production or closely allied industries. Students are taught the principles of breeding and genetics, nutrition and feeding, animal health, environmental control and waste management as they relate to profitable swine production systems. These principles are reinforced by hands-on experience with the department’s swine herd. Career paths include management of swine production units and technical service or sales for feed, pharmaceutical and breeding stock companies.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGLS 101</td>
<td>Modern Agricultural Systems and Renewable Natural Resources</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 108</td>
<td>General Animal Science</td>
<td>1</td>
</tr>
<tr>
<td>ANSC 303</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANSC 305</td>
<td>Animal Breeding</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 307</td>
<td>Meats</td>
<td>3</td>
</tr>
<tr>
<td>FSTC 307</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANSC 318</td>
<td>Feeds and Feeding</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 433</td>
<td>Reproduction in Farm Animals</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 481</td>
<td>Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>

Animal science production requirement 4

Select one of the following:

ANSC 406 Beef Cattle Production and Management
ANSC 412 Swine Production and Management
ANSC 414 Sheep and Goat Production and Management
ANSC 420 Equine Production and Management
ANSC 447 Advanced Meat Science and Technology
DASC 418 Feeding and Management of Dairy Cattle

GENE 301 Comprehensive Genetics
& GENE 312 and Comprehensive Genetics Laboratory

STAT 301 Introduction to Biometry

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 437</td>
<td>Marketing and Grading of Livestock and Meats</td>
<td>3</td>
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</tbody>
</table>

CHEM 222 Elements of Organic and Biological Chemistry 3

ENTO 201 General Entomology 3

or ENTO 20: Veterinary Entomology and & ENTO 205 Veterinary Entomology Laboratory

AGEC 330 Financial Management in Agriculture 3

or FINC 409 Survey of Finance Principles

Management elective 3

Select one of the following:

AGEC 325 Principles of Farm and Ranch Management
AGEC 340 Agribusiness Management

MGMT 309 Survey of Management

Biol 206 Introductory Microbiology 3-4

or DASC 326 Food Bacteriology

FSTC 326

Physiology elective 3

Select one of the following:

ANSC 242 Growth and Development of Livestock

VLCS 422 Equine Disease and Epidemiology

VTPP 323 Animal Physiology

Production elective 3

Select one of the following:

ANSC 311 Equine Behavior and Training

ANSC 337 Meat Merchandising

ANSC 408 Management of Stocker and Feedlot Cattle

ANSC 411 Equine Nutrition and Health

ANSC 434 Animal Reproduction Management

ANSC 439 Feedlot Risk Management

Directed electives 11

Any ANSC courses taken at Texas A&M (p. 717)

General electives 9

University Core Curriculum

ANSC 107 General Animal Science 3

Biol 111 Introductory Biology I 4

or BIOL 107 or Zoology

CHEM 101 Fundamentals of Chemistry I 4

& CHEM 111 and Fundamentals of Chemistry Laboratory I

Communication (p. 22) 6

Government/Political science (p. 25) 6

POLS 206 American National Government

POLS 207 State and Local Government

Social and behavioral sciences 3

Select one of the following:

AGEC 105 Introduction to Agricultural Economics

ECON 202 Principles of Economics

ECON 203 Principles of Economics

American history (p. 25) 6
Language, philosophy and culture (p. 23) 3 3
Mathematics (p. 22) 6
Creative arts (p. 24) 3
Foreign language requirement (see Foreign Language table)
International and cultural diversity (p. 40) 3
Writing-intensive 4

Total Semester Credit Hours 120

1 Students are required to make a C or better for each of their courses in the major coursework area.
2 Credit by examination may be substituted for POLS 206 or POLS 207.
3 The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
4 All undergraduate students must take at least (2) specific courses in their major designated as writing intensive (W). To be chosen in consultation with your academic advisor.

Foreign Language

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
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</tr>
<tr>
<td>Completed two years high school foreign language</td>
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<tr>
<td>Option 2</td>
<td></td>
<td></td>
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<tr>
<td>Select one of the following:</td>
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<td></td>
</tr>
<tr>
<td>CLAS 101 &amp; CLAS 102</td>
<td>Beginning Classical Greek I &amp; Beginning Classical Greek II</td>
<td>8</td>
</tr>
<tr>
<td>CLAS 121 &amp; CLAS 122</td>
<td>Beginning Latin I &amp; Beginning Latin II</td>
<td>8</td>
</tr>
<tr>
<td>FREN 101 &amp; FREN 102</td>
<td>Beginning French I &amp; Beginning French II</td>
<td>8</td>
</tr>
<tr>
<td>GERM 101 &amp; GERM 102</td>
<td>Beginning German I &amp; Beginning German II</td>
<td>8</td>
</tr>
<tr>
<td>ITAL 101 &amp; ITAL 102</td>
<td>Beginning Italian I &amp; Beginning Italian II</td>
<td>8</td>
</tr>
<tr>
<td>JAPN 101 &amp; JAPN 102</td>
<td>Beginning Japanese I &amp; Beginning Japanese II</td>
<td>8</td>
</tr>
<tr>
<td>RUSS 101 &amp; RUSS 102</td>
<td>Beginning Russian I &amp; Beginning Russian II</td>
<td>8</td>
</tr>
<tr>
<td>SPAN 101 &amp; SPAN 102</td>
<td>Beginning Spanish I &amp; Beginning Spanish II</td>
<td>8</td>
</tr>
</tbody>
</table>

Animal Science - BS, Science Option

This curriculum is designed to provide scientific expertise in chemistry, biological and physical sciences and mathematics and is recommended for students considering entry into the veterinary, medical or allied health field, or the graduate program of their choice. This option provides a strong background for graduate study in a wide variety of disciplines. Animal scientists graduating with a Bachelor of Science degree in this option who do not enter graduate or professional school find employment in rewarding careers in the pharmaceutical, clinical and food-related industries. Students may concentrate on an emphasis area within this option, including the following.

Pre-Professional

Students planning to pursue a career in veterinary medicine can complete all course requirements for admission to the professional curriculum in this emphasis. Students gain experience working with animals through direct contact in laboratory courses and directed field study. Students acquire knowledge of animal systems and animal behavior principles through coursework and interaction with livestock industry leaders. Students are also prepared to seek admission to the professional curricula in medicine, dentistry, pharmacy, optometry and physical therapy.

Pre-graduate Studies

This emphasis prepares students to pursue a Master of Science, Master of Agriculture or Doctor of Philosophy degree. Possible graduate programs include animal behavior, animal breeding, biochemistry, cellular and molecular biology, meats, dairy science, food science and technology, genetics, growth biology, nutrition and reproductive physiology. Experience gained through honors courses, internships, special problems courses and research laboratories helps the student identify specific disciplines of interest for graduate study. Students with advanced degrees are employed as university professors, research scientists or technicians, extension livestock specialists and technical representatives for industry.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Animal Science Core Curriculum 1</td>
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<tr>
<td>AGLS 101</td>
<td>Modern Agricultural Systems and Renewable Natural Resources</td>
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<td>ANSC 108</td>
<td>General Animal Science</td>
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<tr>
<td>ANSC 303/ NUTR 303</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
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<tr>
<td>ANSC 305</td>
<td>Animal Breeding</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 307/ FSTC 307</td>
<td>Meats</td>
<td>3</td>
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<tr>
<td>ANSC 318</td>
<td>Feeds and Feeding</td>
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<tr>
<td>ANSC 433</td>
<td>Reproduction in Farm Animals</td>
<td>3</td>
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<tr>
<td>ANSC 481</td>
<td>Seminar</td>
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<tr>
<td></td>
<td>Animal science production requirement</td>
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<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td>ANSC 406</td>
<td>Beef Cattle Production and Management</td>
<td></td>
</tr>
<tr>
<td>ANSC 412</td>
<td>Swine Production and Management</td>
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<tr>
<td>ANSC 414</td>
<td>Sheep and Goat Production and Management</td>
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<tr>
<td>ANSC 420</td>
<td>Equine Production and Management</td>
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</tr>
<tr>
<td>ANSC 447</td>
<td>Advanced Meat Science and Technology</td>
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</tr>
<tr>
<td>DASC 418</td>
<td>Feeding and Management of Dairy Cattle</td>
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<tr>
<td>GENE 301 &amp; GENE 312</td>
<td>Comprehensive Genetics and Comprehensive Genetics Laboratory</td>
<td>4</td>
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<tr>
<td>STAT 301</td>
<td>Introduction to Biometry</td>
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Science Option Curriculum

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
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<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
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</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Fundamentals of Chemistry Laboratory II</td>
<td>1</td>
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<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
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<td>CHEM 228</td>
<td>Organic Chemistry II</td>
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<td>CHEM 238</td>
<td>Organic Chemistry Laboratory</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
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<td>PHYS 202</td>
<td>College Physics</td>
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<td>Microbiology elective</td>
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</table>

Select one of the following:
- BIOL 206 Introductory Microbiology
- BIOL 351 Fundamentals of Microbiology
- VTPB 405 Biomedical Microbiology

Physiology elective 3-4
- VTPP 323 Animal Physiology or BIOL 3 or Integrated Human Anatomy and Physiology I

General electives 2

University Core Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ANSC 107</td>
<td>General Animal Science</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry</td>
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<tr>
<td>&amp; CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
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<tr>
<td>or COMM 203 or Public Speaking</td>
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<tr>
<td>Government/Political science electives (p. 25)^3</td>
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<tr>
<td>Social and Behavioral Science core course (p. 25)</td>
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<tr>
<td>American History elective (p. 25)^4</td>
<td>6</td>
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<tr>
<td>Language, Philosophy and Culture elective (p. 23)^4</td>
<td>3</td>
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<tr>
<td>Mathematics elective (p. 22)</td>
<td>6</td>
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<tr>
<td>Creative arts elective (p. 24)^4</td>
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<tr>
<td>Foreign language requirement (see Foreign Language table)</td>
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<tr>
<td>International and cultural diversity courses^5</td>
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<tr>
<td>Writing-intensive courses^5</td>
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</table>

Total Semester Credit Hours 120

1 Students are required to make a C or better for each of their courses in the major coursework area.
2 Students may choose to use general electives to complete a concentration in a pre-professional program, a pre-graduate study area, and/or a certificate program.
3 Credit by examination may be substituted for POLS 206 or POLS 207.
4 Certain courses in this University Core Curriculum category will fulfill credits toward the six-hour International and Cultural Diversity requirement.
5 Remaining international and cultural diversity (ICD) credits must be fulfilled if University Core Curriculum courses selected do not fulfill the six-hour ICD requirement.
6 All undergraduate students must take at least (2) specific courses in their major designated as writing intensive (W). To be chosen in consultation with your academic advisor.

Foreign Language

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
</table>

Option 1
- Completed two years high school foreign language

Option 2
Select one of the following:
- CLAS 101 Beginning Classical Greek I
- & CLAS 102 Beginning Classical Greek II
- CLAS 121 Beginning Latin I
- & CLAS 122 Beginning Latin II
- FREN 101 Beginning French I
- & FREN 102 Beginning French II
- GERM 101 Beginning German I
- & GERM 102 Beginning German II
- ITAL 101 Beginning Italian I
- & ITAL 102 Beginning Italian II
- JAPN 101 Beginning Japanese I
- & JAPN 102 Beginning Japanese II
- RUSS 101 Beginning Russian I
- & RUSS 102 Beginning Russian II
- SPAN 101 Beginning Spanish I
- & SPAN 102 Beginning Spanish II

Equine Science - Certificate
The Department of Animal Science offers a certificate in Equine Science for students who wish to obtain specialization in this area.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ANSC 201</td>
<td>Introductory Equine Care and Use</td>
<td>2</td>
</tr>
<tr>
<td>ANSC 211</td>
<td>Equine Industry and Career Preparation</td>
<td>2</td>
</tr>
<tr>
<td>ANSC 311</td>
<td>Equine Behavior and Training</td>
<td>3</td>
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<tr>
<td>ANSC 411</td>
<td>Equine Nutrition and Health</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 420</td>
<td>Equine Production and Management</td>
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</tr>
<tr>
<td>ANSC 423</td>
<td>Issues in the Equine Industry</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 494</td>
<td>Animal Science Internship</td>
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</tr>
<tr>
<td>VLCS 422</td>
<td>Equine Disease and Epidemiology</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 23

Meat Science - Certificate
The Department of Animal Science offers a certificate in Meat Science for students who wish to obtain specialization in this area. The certificate is designed to provide a knowledge base to those individuals who
have an interest in pursuing a career that involves the meat industry. Students must complete a minimum of 18 credit hours by taking four required courses and selecting additional courses from the elective list to complete the minimum credit hour requirement.

## Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ANSC 307/</td>
<td>Meats</td>
<td>3</td>
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<tr>
<td>FSTC 307</td>
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<tr>
<td>DASC 326/</td>
<td>Food Bacteriology</td>
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<td>FSTC 326</td>
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<td>ANSC 447</td>
<td>Advanced Meat Science and Technology ¹</td>
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<tr>
<td>ANSC 457/</td>
<td>Hazard Analysis and Critical Control Point System</td>
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<td>FSTC 457</td>
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Select 5 semester credit hours from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ANSC 317</td>
<td>Meat Selection, Evaluation and Grading</td>
</tr>
<tr>
<td>ANSC 337</td>
<td>Meat Merchandising ²</td>
</tr>
<tr>
<td>ANSC 437</td>
<td>Marketing and Grading of Livestock and Meats</td>
</tr>
<tr>
<td>ANSC 485</td>
<td>Directed Studies</td>
</tr>
<tr>
<td>DASC 327/</td>
<td>Food Bacteriology Lab</td>
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<tr>
<td>FSTC 327</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

¹ Students who have taken ANSC 489, Special Topics in Advanced Meat Technology, will be credited with ANSC 447.

² Students who have taken ANSC 489, Special Topics in Meat Merchandising, will be credited with ANSC 337.

## Department of Biochemistry/Biophysics

Curriculum in Biochemistry is administered by the Department of Biochemistry and Biophysics.

Biochemists seek to understand life at the molecular level, including the detailed structures of biological molecules and the chemical reactions in which they participate. They study the molecules of living systems of all kinds, from the simplest viruses and bacteria to higher plants and animals. In their work, biochemists use experimental tools ranging from x-ray crystallography and nuclear magnetic resonance to bioinformatics and genetic engineering. Biochemistry is a dynamic and diverse field that has become the basic discipline for the life sciences, and biochemists have made significant discoveries that relate to medicine, agriculture, and the environment.

## Faculty

Ayres, Nicola M, Senior Lecturer
Biochemistry & Biophysics
PHD, University of Nebraska - Lincoln, 1987

Bryk, Mary E, Associate Professor
Biochemistry & Biophysics
PHD, Albany Medical College, 1994

Cho, Jae H, Assistant Professor
Biochemistry & Biophysics
PHD, State University of New York at Stony Brook, 2006

Cruz-Reyes, Jorge A, Professor
Biochemistry & Biophysics
PHD, London School of Hygiene & Tropical Medicine, 1992

Datta, Sumana, Associate Professor
Biochemistry & Biophysics
PHD, University of California, San Diego, 1987

Devarene, Timothy P, Associate Professor
Biochemistry & Biophysics
PHD, University of Kentucky, 2000

Glasner, Margaret E, Associate Professor
Biochemistry & Biophysics
PHD, Massachusetts Institute of Technology, 2003

Gohil, Vishal M, Assistant Professor
Biochemistry & Biophysics
PHD, Wayne State University, 2005

He, Ping, Professor
Biochemistry & Biophysics
PHD, Kansas State University, 2003

Henderson, Michelle, Lecturer
Biochemistry & Biophysics
PHD, Texas A&M University, 2010

Herman, Jennifer K, Associate Professor
Biochemistry & Biophysics
PHD, Indiana University, 2005

Hu, James C, Professor
Biochemistry & Biophysics
PHD, University of Wisconsin - Madison, 1987

Igumenova, Tatyana I, Associate Professor
Biochemistry & Biophysics
PHD, Columbia University, 2003

Kaplan, Craig D, Associate Professor
Biochemistry & Biophysics
PHD, Harvard University, 2003

Kunkel, Gary R, Associate Professor
Biochemistry & Biophysics
PHD, University of California, Los Angeles, 1977

Li, Pingwei, Professor
Biochemistry & Biophysics
PHD, Peking University, China, 1996

Meek, Thomas D, Professor
Biochemistry & Biophysics
PHD, The Pennsylvania State University, 1981

Miles, Bryant W, Senior Lecturer
Biochemistry & Biophysics
PHD, Texas A&M University, 1998
Mullet, John E, Professor  
Biochemistry & Biophysics  
PHD, University of Illinois at Urbana-Champaign, 1981

Mullins, Leisha H, Senior Lecturer  
Biochemistry & Biophysics  
PHD, Texas A&M University, 1989

Panin, Vladislav M, Professor  
Biochemistry & Biophysics  
PHD, Moscow State University, 1990

Park, William D, Professor  
Biochemistry & Biophysics  
PHD, University of Florida, 1977

Pellois, Jean-Philippe, Professor  
Biochemistry & Biophysics  
PHD, University of Houston, 2002

Peterson, David O, Professor  
Biochemistry & Biophysics  
PHD, Harvard University, 1977

Pishko, Elizabeth J, Lecturer  
Biochemistry & Biophysics  
PHD, The University of Texas at Austin, 1993

Polymenis, Michael S, Professor  
Biochemistry & Biophysics  
PHD, Tufts University, 1994

Reinhart, Gregory D, Professor  
Biochemistry & Biophysics  
PHD, University of Wisconsin - Madison, 1979

Reynolds, Mollie M, Lecturer  
Biochemistry & Biophysics  
PHD, Texas A&M University, 2010

Rye, Chavela M, Lecturer  
Biochemistry & Biophysics  
PHD, Massachusetts Institute of Technology, 2014

Rye, Hays S, Associate Professor  
Biochemistry & Biophysics  
PHD, University of California, Berkeley, 1995

Sacchettini, James C, Professor  
Biochemistry & Biophysics  
PHD, Washington University in St. Louis, 1987

Shippen, Dorothy E, Professor  
Biochemistry & Biophysics  
PHD, The University of Alabama at Birmingham, 1987

Straight, Paul D, Associate Professor  
Biochemistry & Biophysics  
PHD, University of Colorado, 2000

Young, Ryland F, Professor  
Biochemistry & Biophysics  
PHD, The University of Texas at Dallas, 1975

Zeng, Lanying, Assistant Professor  
Biochemistry & Biophysics  
PHD, University of Illinois at Urbana-Champaign, 2007

Zhang, Junjie, Assistant Professor  
Biochemistry & Biophysics  
PHD, Baylor College of Medicine, 2009

Zhang, Xiuren, Associate Professor  
Biochemistry & Biophysics  
PHD, Cornell University, 2003

### Majors

- Bachelor of Science in Biochemistry (p. 143)
- Bachelor of Science in Genetics (p. 144)

### Minors

- Biochemistry Minor (p. 146)
- Genetics Minor (p. 146)

### Biochemistry - BS

The undergraduate biochemistry curriculum is designed to provide a solid background in chemistry and the physical sciences, as well as in the biological sciences. Consequently, biochemistry is an especially versatile major giving undergraduates many options when they complete their BS degree. A biochemistry major provides a strong background for entering graduate school in a variety of fields, and the majority of biochemistry majors go on to graduate school or to professional schools such as medicine, veterinary medicine or dentistry. Biochemistry majors excel in biomedical professional schools because of their strong background in the basic sciences. In addition, a wide variety of job opportunities is open to biochemistry majors with a BS degree. Many find rewarding careers working in laboratories as research scientists, forensic scientists and technicians in clinical, governmental and university laboratories. Biochemists are also employed by diverse companies in the chemical, pharmaceutical, agricultural, food and scientific equipment industries.

Majors in Biochemistry must make a grade of C or better in CHEM 227, CHEM 237, CHEM 228 and CHEM 238 before registration in BICH 440. In addition, majors in Biochemistry must make a grade of C or better in all major coursework used to satisfy the degree plan.

### Program Requirements

#### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BICH 101</td>
<td>Perspectives in Biochemistry and Genetics</td>
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<tr>
<td>GENE 101</td>
<td>Introductory Biology I</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric I</td>
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<td>Free elective</td>
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**Spring**

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<tbody>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
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</tbody>
</table>
Genetics - BS

Curriculum in Genetics is administered by the Department of Biochemistry and Biophysics.

Genetics is one of the most exciting, rapidly expanding areas in the life sciences. More than an independent discipline, it has become the basis for understanding many aspects of medical and agricultural systems, animal and plant diseases, and even animal behavior. Developments in molecular genetics have provided biotechnologies that will dramatically affect our lives from the improved diagnosis of human disease, to the production of viral-resistant crops, to environmental cleanup.

The undergraduate curriculum in genetics allows the study of several different aspects of genetics, including population genetics, human
genetics and genetic engineering. The genetics major is designed to develop the knowledge and skills necessary for advanced studies in all disciplines related to life sciences from medicine/veterinary medicine to genetic engineering. This basic science curriculum also has enough flexibility to allow a student to prepare for such diverse careers as forensics, medicine, business or law.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>GENE 101/BICH 101</td>
<td>Perspectives in Biochemistry and Genetics</td>
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<td>Free elective</td>
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<table>
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<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<tr>
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<td>Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<td>Select one of the following:</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
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Second Year

<table>
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<th>Semester</th>
<th>Credit Hours</th>
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<tr>
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</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<tr>
<td>MATH 172</td>
<td>Calculus</td>
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<td>PHYS 201</td>
<td>College Physics</td>
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<td>University Core Curriculum (p. 22)</td>
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<tr>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>CHEM 238</td>
<td>Organic Chemistry Laboratory</td>
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<td>PHYS 202</td>
<td>College Physics</td>
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<td>University Core Curriculum (p. 22)</td>
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<td>Free elective</td>
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Third Year

<table>
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<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>BICH 404</td>
<td>Biochemical Calculations</td>
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<tr>
<td>BICH 440</td>
<td>Biochemistry I</td>
</tr>
<tr>
<td>GENE 302 &amp; GENE 312</td>
<td>Principles of Genetics and Comprehensive Genetics Laboratory</td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
</tr>
<tr>
<td>University Core Curriculum (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
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<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BICH 441</td>
<td>Biochemistry II</td>
</tr>
<tr>
<td>GENE 412</td>
<td>Population and Ecological Genetics</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>2</td>
</tr>
<tr>
<td>GENE 432/BICH 432</td>
<td>Laboratory in Molecular Genetics</td>
</tr>
<tr>
<td>BICH 414</td>
<td>Biochemical Techniques I</td>
</tr>
<tr>
<td>GENE 491</td>
<td>Research</td>
</tr>
<tr>
<td>Genetics elective (p. 821)</td>
<td>3</td>
</tr>
<tr>
<td>Free elective</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tr>
<td>Fall</td>
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<tr>
<td>GENE 491</td>
<td>Research</td>
</tr>
<tr>
<td>Genetics elective (p. 821)</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 22)</td>
<td>2</td>
</tr>
<tr>
<td>Free elective</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>GENE 491</td>
<td>Research</td>
</tr>
<tr>
<td>Genetics elective (p. 821)</td>
<td>4</td>
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<tr>
<td>University Core Curriculum (p. 22)</td>
<td>2</td>
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<tr>
<td>Free electives</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
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</table>

**Total Semester Credit Hours** 120

1 Often used for a minor degree. Students intending to pursue an advanced degree in genetics are strongly encouraged to use some free electives for additional upper division courses in BICH (p. 739), BIOL (p. 741), CHEM (p. 752), GENE (p. 821), MATH (p. 885) or STAT (p. 970).

2 To be selected from the University Core Curriculum (p. 21). Of the 21 hours shown as University Core Curriculum (p. 21) electives, 3 must be from language, philosophy and culture, 3 from creative arts, 3 from social and behavioral sciences, 6 from American history, 6 from POLS 206 and POLS 207. The Graduation requirements include a requirement for 6 hours of International and Cultural Diversity (p. 40) courses which may be met by courses satisfying the language, philosophy and culture, creative arts, social and behavioral sciences, government/political science and American history requirements if they are also on the approved list of international and cultural diversity courses.

3 Before registration in BICH 440, students must have attained a grade of C or better in each of these courses: CHEM 227, CHEM 228, CHEM 237, CHEM 238.

4 Hours to be selected from any 400-level course in GENE with approval of student’s academic advisor. GENE 432/BICH 432 or GENE 491 may not be used to satisfy this requirement.
The fourth registered hour of research credit must be taken as writing intensive.

Students must make a grade of C or better in all major coursework used to satisfy the degree plan.

**Biochemistry - Minor**

The Department of Biochemistry and Biophysics offers a minor in Biochemistry. Students seeking a minor must complete a minor form (http://biochemistry.tamu.edu/academics/undergraduate-programs/academic-requirements/minors) and have it approved and signed by the BICH/GENE undergraduate advisor and their major academic advisor. Students are required to obtain a grade of 'C' or better in all minor courses and meet all minor course prerequisites.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
<td>3</td>
</tr>
<tr>
<td>or BICH 440</td>
<td>or Biochemistry I</td>
<td></td>
</tr>
<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
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<tr>
<td>or BICH 441</td>
<td>or Biochemistry II</td>
<td></td>
</tr>
<tr>
<td>BICH 414</td>
<td>Biochemical Techniques I</td>
<td>2</td>
</tr>
<tr>
<td>or BICH 432/</td>
<td>or Laboratory in Molecular</td>
<td></td>
</tr>
<tr>
<td>GENE 432</td>
<td>Genetics</td>
<td></td>
</tr>
<tr>
<td>BICH 431/</td>
<td>Molecular Genetics</td>
<td>3</td>
</tr>
<tr>
<td>GENE 431</td>
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<tr>
<td>CHEM 327</td>
<td>Physical Chemistry I</td>
<td>3</td>
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<tr>
<td>Biochemistry elective (p. 739)</td>
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<tr>
<td>Total Semester Credit Hours</td>
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</table>

1 Hours to be selected from any 400-level course in BICH with approval of academic advisor.

Students must make a grade of "C" or better in all courses.

**Genetics - Minor**

The Department of Biochemistry and Biophysics offers a minor in Genetics. Students seeking a minor must complete a minor form (http://biochemistry.tamu.edu/academics/undergraduate-programs/academic-requirements/minors) and have it approved and signed by the BICH/GENE undergraduate advisor and their major academic advisor. Students are required to obtain a grade of 'C' or better in all minor courses and meet all minor course prerequisites.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>GENE 301</td>
<td>Comprehensive Genetics</td>
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<tr>
<td>GENE 302</td>
<td>Principles of Genetics</td>
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<tr>
<td>GENE 320/</td>
<td>Biomedical Genetics</td>
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<tr>
<td>BIMS 320</td>
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<td>GENE 412</td>
<td>Population and Ecological Genetics</td>
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<tr>
<td>GENE 431/</td>
<td>Molecular Genetics</td>
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<td>BICH 431</td>
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Select two of the following: 6

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<tr>
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<tbody>
<tr>
<td>GENE 404</td>
<td>Plant Breeding</td>
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<tr>
<td>GENE 405/</td>
<td>Mammalian Genetics</td>
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<tr>
<td>BIMS 405</td>
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</tr>
<tr>
<td>GENE 406/</td>
<td>Bacterial Genetics</td>
</tr>
<tr>
<td>BIOL 406</td>
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</tr>
<tr>
<td>GENE 420</td>
<td>Bioethics</td>
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<tr>
<td>GENE 421/</td>
<td>Advanced Human Genetics</td>
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<tr>
<td>BIMS 421</td>
<td></td>
</tr>
<tr>
<td>GENE 450</td>
<td>Recombinant DNA and Biotechnology</td>
</tr>
<tr>
<td>GENE 452/</td>
<td>Modifying Mammalian Genomes for</td>
</tr>
<tr>
<td>BIMS 452</td>
<td>Biomedical Research</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

**Department of Biological and Agricultural Engineering**

Biological and agricultural engineers apply their knowledge of physical and biological sciences, mathematics, engineering principles and engineering design to the production and processing of food and fiber, to the preservation of environmental quality, to biological systems and processes, and to machine systems that interface with all of these. Because of their broad general engineering background, biological and agricultural engineering graduates are sought by a wide variety of employers including environmental consulting firms, equipment manufacturers, crop storage and handling industries, the cotton and forest products industries, food and feed processing industries, animal production industries, biotechnology companies, electric utility companies, chemical companies, and governmental agencies. Biological and agricultural engineers make significant contributions to meeting many basic needs of society such as maintaining food quality, quantity and safety; improving environmental quality; and enhancing the quantity and quality of our water resources.

The Biological and Agricultural Engineering Department provides quality education, research and outreach in engineering and technology for the world's agricultural, biological, environmental and food systems. Our undergraduate programs provide a high quality education for engineering and systems management students to fulfill the needs of industries we serve and advance our reputation as a world leader in engineering and systems management education.

**Faculty**

Agarwal, Girish S, Professor
Biological and Agricultural Eng
PHD, University of Rochester, 1969

Capareda, Sergio C, Professor
Biological and Agricultural Eng
PHD, Texas A&M University, 1990

Castell-Perez, M Elena, Professor
Biological and Agricultural Eng
PHD, Michigan State University, 1990

Fernando, Sandun D, Professor
Biological and Agricultural Eng
PHD, University of Nebraska, 2003
Gomes, Carmen L, Associate Professor
Biological and Agricultural Eng
PHD, Texas A&M University, 2010

Huang, Yongheng, Associate Professor
Biological and Agricultural Eng
PHD, University of Nebraska - Lincoln, 2002

Karthikeyan, Raghupathy, Associate Professor
Biological and Agricultural Eng
PHD, Kansas State University, 2001

Kingman, Douglas M, Instructional Associate Professor
Biological and Agricultural Eng
PHD, Purdue University, 2002

Lacey, Ronald E, Professor
Biological and Agricultural Eng
PHD, University of Kentucky, 1992

Mohanty, Binayak P, Professor
Biological and Agricultural Eng
PHD, Iowa State University, 1992

Mohtar, Rabi H, Professor
Biological and Agricultural Eng
PHD, Michigan State University, 1994

Moreira, Rosana G, Professor
Biological and Agricultural Eng
PHD, Michigan State University, 1989

Munster, Clyde L, Professor
Biological and Agricultural Eng
PHD, North Carolina State University, 1992

Nikolov, Zivko L, Professor
Biological and Agricultural Eng
PHD, Iowa State University, 1986

Riskowski, Gerald L, Professor
Biological and Agricultural Eng
PHD, Iowa State University, 1986

Searcy, Stephen W, Senior Professor
Biological and Agricultural Eng
PHD, Oklahoma State University, 1980

Singh, Vijay P, Professor
Biological and Agricultural Eng
PHD, Colorado State University, 1974

Smith, Patricia K, Professor
Biological and Agricultural Eng
PHD, North Carolina State University, 2000

Stark, Gregory L, Assistant Professor of the Practice
Biological and Agricultural Eng
MPH, University of Nebraska - Lincoln, 1986

Thomasson, John A, Professor
Biological and Agricultural Eng
PHD, University of Kentucky, 1997

Majors

• Bachelor of Science in Agricultural Systems Management (p. 147)
• Bachelor of Science in Biological and Agricultural Engineering (p. 148)

Minors

• Agricultural Systems Management Minor (p. 150)

Agricultural Systems Management - BS

Graduates of the Agricultural Systems Management program manage people, money and machines in the food and agricultural industries. They are typically employed as production or processing operations managers, equipment managers, or in technical sales and services. Employers include farm and industrial equipment companies, food processing plants, cotton gins, grain and seed companies, livestock feeding operations, irrigation companies, construction companies, manufacturers, and a variety of other employers who need technical managers.

The technological courses are applications-oriented and focus on practical experience in food processing systems, water management, machinery and power systems, electrical systems and electronics. Business courses include accounting, economics, marketing, management, law and finance. The Business minor is built into the AGSM degree program (with no additional courses required), or students can obtain a minor in Agricultural Economics by taking one additional class. Management and systems science techniques such as linear programming, simulation, optimization, queuing theory, inventory models, PERT/CPM and expert systems are taught along with applications for solving realistic problems faced by agribusiness managers. Supporting courses provide a foundation of mathematics, chemistry, computer and communications skills. Technical electives are available to develop a degree program that meets personal career objectives.

The curriculum is administered by the Department of Biological and Agricultural Engineering and leads to the Bachelor of Science degree in Agricultural Systems Management.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>AGSM 201</td>
<td>Agricultural Energy and Power Systems</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
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<tr>
<td>Government/Political science elective (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Creative arts elective (p. 24)</td>
<td>1,2</td>
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<tr>
<td>AGSM 125</td>
<td>Introduction to Agricultural Systems Management</td>
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Spring

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<tr>
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<tbody>
<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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</table>
MATH 142 Business Calculus 3
Government/Political science elective (p. 25) 1 3
MMET 105 Engineering Graphics 2

 Semester Credit Hours 15

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles 3</td>
<td>3</td>
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<tr>
<td>AGSM 301</td>
<td>Systems Analysis in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<td>PHYS 201</td>
<td>College Physics</td>
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 Semester Credit Hours 16

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<tbody>
<tr>
<td>ACCT 210</td>
<td>Survey of Managerial and Cost Accounting Principles</td>
<td>3</td>
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<tr>
<td>AGSM 360</td>
<td>Occupational Safety Management</td>
<td>3</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
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<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
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 Semester Credit Hours 15

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<thead>
<tr>
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<tbody>
<tr>
<td>AGEC 330</td>
<td>Financial Management in Agriculture 3</td>
<td>3</td>
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<tr>
<td>or FINC 409</td>
<td>or Survey of Finance Principles</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23) 1,2</td>
<td>3</td>
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<tr>
<td>American history elective (p. 25) 1,2</td>
<td>3</td>
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<tr>
<td>AGSM 335</td>
<td>Water and Soil Management</td>
<td>3</td>
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<tr>
<td>AGSM 337</td>
<td>Technology for Environmental and Natural Resource Engineering</td>
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 Semester Credit Hours 15

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<tbody>
<tr>
<td>AGSM 310</td>
<td>Agricultural Machinery Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 315/ FSTC 315</td>
<td>Food Process Engineering Technology</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 325</td>
<td>Agri-Industrial Applications of Electricity</td>
<td>3</td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
<td>3</td>
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<tr>
<td>or STAT 303</td>
<td>or Statistical Methods</td>
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 Select one of the following: 3

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<tbody>
<tr>
<td>AGEC 344</td>
<td>Food and Agricultural Law</td>
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<tr>
<td>MGMT 209</td>
<td>Business, Government and Society 3</td>
</tr>
<tr>
<td>MGMT 212</td>
<td>Business Law</td>
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 Semester Credit Hours 15

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<tbody>
<tr>
<td>AGEC 315</td>
<td>Food and Agricultural Sales (or Technical elective) 5</td>
<td>3</td>
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<tr>
<td>MGMT 309</td>
<td>Survey of Management 3</td>
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<tr>
<td>or AGEC 340</td>
<td>or Agribusiness Management</td>
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<tr>
<td>AGSM 403</td>
<td>Processing and Storage of Agricultural Products</td>
<td>3</td>
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<tr>
<td>AGSM 439</td>
<td>Management of Agricultural Systems I 6</td>
<td>3</td>
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 Select one of the following: 3

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<thead>
<tr>
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<tbody>
<tr>
<td>AGSM 470</td>
<td>Agricultural Electronics and Control</td>
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 Semester Credit Hours 15

<p>| | |</p>
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<th></th>
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<tbody>
<tr>
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</table>

 AGSM 473 | Project Management for Agricultural Systems Technology (Select one of the following) |
| ESSM 351/ | Geographic Information Systems for Resource Management |
| RENR 405 | Resource Management |
| RENR 405/ | Geographic Information Systems for Resource Management |

 Semester Credit Hours 18

<table>
<thead>
<tr>
<th>Spring</th>
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<tbody>
<tr>
<td>MKTG 409</td>
<td>Principles of Marketing 3</td>
<td>3</td>
</tr>
<tr>
<td>or AGEC 314</td>
<td>or Marketing Agricultural and Food Products</td>
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</table>

 AGSM 440 | Management of Agricultural Systems II 6 | 3 |

 Technical electives 2,5 | 6 |

 American history elective (p. 25) 1,2 | 3 |

 Semester Credit Hours 15

 Total Semester Credit Hours 125

1. To be selected from the University Core Curriculum.
2. The 6 hours of international and cultural diversity courses, as required for graduation, may be met in the curriculum. Students may select Language, Philosophy and Culture, Creative Arts, Technical Electives, or American History Electives that also meet the ICD requirement.
3. A minor in BUAD may be obtained by completing the noted courses. Each of these courses must be completed with a C or better.
4. To be selected from a departmental approved list.
5. Technical electives must be selected in consultation with the student’s advisor and from the current list of approved electives published by the department.
6. All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive (W). This course is an approved W course.

A grade of C or better is required for all Common Body of Knowledge (CBK) courses; ACCT 209, AGSM 301, CHEM 101, CHEM 111, ECON 202, MATH 141, MATH 142 and PHYS 201, or equivalents and senior capstone courses AGSM 439 and AGSM 440.

**Biological and Agricultural Engineering - BS**

Graduates from the Biological and Agricultural Engineering program will:

- Successfully enter the biological and agricultural engineering profession as practicing engineers and consultants in the natural resources, machine systems, food processing, bioprocessing, and agricultural production and processing fields.
- Pursue graduate education and research at major universities in biological and agricultural engineering, and related fields.
- Advance into leadership positions in their chosen fields and professional societies.
- Engage in life-long learning through professional registration and professional development.

Students learn to apply fundamental knowledge of biological and physical sciences, mathematics, and engineering principles to formulate and solve engineering problems. Engineering design is integrated
throughout the curriculum, along with opportunities to develop communication, learning, and teamwork skills, culminating in a capstone design experience. Electives in the curriculum allow the student to focus in one of the following areas:

- **Environmental and Natural Resources Engineering**—design and management of systems affecting soil, water, and air resources.
- **Renewable Energy Engineering**—design and development of biomass, wind and solar energy systems.
- **Food and Bioprocess Engineering**—design and development of systems for processing and handling of food and agricultural products and processes involving cells, enzymes, or other biological components.
- **Machine Systems Engineering**—design and development of machines and machine systems for food, feed and fiber production and processing.

Students select courses with the assistance of faculty advisors in an individualized advising system. Faculty members also assist with professional development and job placement for students.

The biological and agricultural engineering program is jointly administered by the College of Agriculture and Life Sciences and the College of Engineering, and the curriculum is fully accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org. The department is one of the largest in North America and is consistently ranked as one of the top programs in the nation.

For graduates to become successful practicing biological and agricultural engineers, students need to acquire a set of skills, knowledge, and behaviors as they progress through the curriculum. We have established the following program outcomes outlining what students are expected to know and be able to do upon completion of the curriculum. At the time of graduation, students should have:

1. an ability to apply knowledge of mathematics, science and engineering;
2. an ability to design and conduct experiments, as well as to analyze and interpret data;
3. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
4. an ability to function on multidisciplinary teams;
5. an ability to identify, formulate, and solve engineering problems;
6. an understanding of professional and ethical responsibility;
7. an ability to communicate effectively;
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
9. a recognition of the need for, and an ability to engage in life-long learning;
10. a knowledge of contemporary issues;
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### Program Requirements

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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**Spring**

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
<td>2</td>
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<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
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**Second Year**

**Fall**

<table>
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<th>Title</th>
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<tbody>
<tr>
<td>CHEM 222</td>
<td>Elements of Organic and Biological Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 221</td>
<td>Statics and Particle Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 222/ MSEN 222</td>
<td>Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>Government/Political science (p. 25)</td>
<td></td>
<td>3</td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BAEN 201</td>
<td>Analysis of Biological and Agricultural Engineering Problems</td>
<td>3</td>
</tr>
<tr>
<td>BAEN 301</td>
<td>Biological and Agricultural Engineering Fundamentals I</td>
<td>3</td>
</tr>
<tr>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
<td>3</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
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<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
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**Third Year**

**Fall**

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<tr>
<td>BAEN 302</td>
<td>Biological and Agricultural Engineering Fundamentals II</td>
<td>3</td>
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<tr>
<td>BAEN 340</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>BAEN 354</td>
<td>Engineering Properties of Biological Materials</td>
<td>3</td>
</tr>
<tr>
<td>BAEN 375</td>
<td>Design Fundamentals for Agricultural Machines and Structures</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
<td>3</td>
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**Semester Credit Hours**

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
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<td>17</td>
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<tr>
<td>15</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>15</td>
</tr>
</tbody>
</table>
Agricultural Systems Management - Minor

The minor in Agricultural Systems Management is available to all students enrolled at Texas A&M University. The primary educational objective of this minor program is to provide students, majoring in other fields, with a fundamental knowledge of the fields of agricultural systems management.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGSM 201</td>
<td>Agricultural Energy and Power Systems</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 301</td>
<td>Systems Analysis in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 325</td>
<td>Agri-Industrial Applications of Electricity</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 335</td>
<td>Water and Soil Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 360</td>
<td>Occupational Safety Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 337</td>
<td>Technology for Environmental and Natural Resource Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or AGSM 47</td>
<td>or Agricultural Electronics and Control</td>
<td></td>
</tr>
</tbody>
</table>

Students must make a grade of "C" or better in all courses.

Department of Ecosystem Science and Management

The Department of Ecosystem Science and Management provides one of the most advanced educational opportunities available to prepare undergraduate students for leadership in the science and stewardship of rangeland, forest and wetland ecosystems across the rural-urban gradient. We offer Bachelors of Science degrees in Ecological Restoration, Forestry, Rangeland Ecology and Management, Renewable Natural Resources, and Spatial Sciences.

Faculty

Boutton, Thomas W, Professor
Ecosystem Science & Mgmt
PHD, Brigham Young University, 1979

Briske, David D, Professor
Ecosystem Science & Mgmt
PHD, Colorado State University, 1978

Casola, Claudio, Assistant Professor
Ecosystem Science & Mgmt
PHD, University of Pisa, Italy, 2006

Eriksson, Marian, Associate Professor
Ecosystem Science & Mgmt
PHD, University of Minnesota, Twin Cities, 1989

Feagin, Russell A, Professor
Ecosystem Science & Mgmt
PHD, Texas A&M University, 2003

Gan, Jianbang, Professor
Ecosystem Science & Mgmt
PHD, Iowa State University, 1990

1 Entering students will normally be given a placement test in mathematics. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.

2 The six hours of international and cultural diversity courses, as required for graduation, may be met by courses that also satisfy a core curriculum course.

3 Engineering, mathematics and technical electives must be selected from a departmental approved list in consultation with an academic advisor.

4 All undergraduate students must take at least two (2) specific courses in their major designated as writing intensive.

5 All engineering students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the BAEN advising office.

A grade of C or better is required for all math, science, and engineering courses.
Ecological Restoration is the process of repairing dysfunctional ecosystems to provide essential ecosystem goods and services important to society. The Ecological Restoration degree prepares students for a career that requires an understanding of the causes of land degradation and strategies for recovery of ecosystems damaged, degraded, or destroyed by natural or human causes.

The curriculum focuses on restoration of damaged ecosystems and landscapes, particularly terrestrial, wetland, and riparian systems in diverse settings that span the rural-urban spectrum. The discipline of ecological restoration requires a strong conceptual/theoretical foundation as well as a practical application component. This degree combines basic sciences, modern technologies, and contemporary ecological knowledge. Students will develop practical capabilities and gain critical understanding of the interaction of biophysical, socio-economic and political drivers that affect land degradation and...
restoration through a program that incorporates integrated coursework and an internship with ecological restoration practitioners.

Completion of this degree will prepare students to assess the causes of ecosystem degradation and to develop strategies for ecological restoration at multiple spatial scales. Graduates will be equipped for professional careers with environmental consulting companies, governmental and non-governmental land management organizations, and regulatory agencies. This degree program also provides a foundation for students planning to pursue advanced degrees in restoration ecology, disturbed land reclamation, natural resources conservation and management, or related fields. The total number of credit hours required for graduation is 120 hours.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSM 201</td>
<td>Exploring Ecosystem Science and Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 306</td>
<td>Plant Functional Ecology and Adaptation</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 351/ SCSC 301</td>
<td>Geographic Information Systems or Biogeography and Global Change</td>
<td>3</td>
</tr>
<tr>
<td>RENR 405</td>
<td>for Resource Management</td>
<td>4</td>
</tr>
<tr>
<td>ESSM 481</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
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Ecological Restoration Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSM 303</td>
<td>Agrostology</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 304</td>
<td>Rangeland Plant Taxonomy</td>
<td>4</td>
</tr>
<tr>
<td>ESSM 318</td>
<td>Coupled Social and Ecological Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 320</td>
<td>Ecosystem Restoration and Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 406</td>
<td>Natural Resources Policy</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 416</td>
<td>Fire Ecology and Natural Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 420</td>
<td>Ecological Restoration of Wetland and Riparian Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 430</td>
<td>Advanced Restoration Ecology</td>
<td>3</td>
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<tr>
<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
<td>3</td>
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<tr>
<td>Emphasis Area electives</td>
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<td>21</td>
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<tr>
<td>Free electives</td>
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</table>

University Core Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
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</table>

Select one from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
<td>4</td>
</tr>
</tbody>
</table>

Forestry - BS

The Department of Ecosystem Science and Management provides one of the most advanced educational opportunities available for developing leaders in the management, conservation and restoration of the world’s diverse forests. Students seeking to study forestry in this department are interested in solving problems related to protecting forest biodiversity, providing wood, water, recreation and wildlife for a growing society, and contributing to the advancement of knowledge about forests. Resolving today’s forest management issues requires a broad education in the biological, physical and social sciences, a solid understanding of the methods used to integrate information from many fields and to solve problems, and an in-depth knowledge of the sophisticated tools and techniques that are an essential part of modern forestry. Curriculum in the Department of Ecosystem Science and Management incorporates these ideas so that motivated and capable students can become competent forest and resource management professionals and scientists.

Forests cover one-third of the land area of the United States. The products and services derived from forests, and the scenic beauty they provide, have contributed to the well-being of the American people since the founding of this country. These benefits range from lumber and paper to recreation and biological diversity. Forests also are renewable. Under proper stewardship, they yield products and biodiversity indefinitely. Proper management of forests, which is the responsibility of the professional forester, results in healthy, productive forests that are capable of serving human needs and providing a quality environment in rural or urban settings.

The primary objective of the Department of Ecosystem Science and Management is to educate students in the scientific management of forest resources. Students select a course of study best suited to their educational and career goals. Students also receive help from faculty
advisors in their areas of interest. The total number of credit hours required for a degree is 120.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem Science and Management Core Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESSM 201</td>
<td>Exploring Ecosystem Science and Management</td>
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<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 306</td>
<td>Plant Functional Ecology and Adaptation</td>
<td>3</td>
</tr>
<tr>
<td>or ESSM 311 or Biogeochemistry and Global Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 351/RENR 405</td>
<td>Geographic Information Systems for Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 481</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ESSM 205</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
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<tr>
<td>Forestry Core Courses</td>
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<td>AGEC 350</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
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<tr>
<td>ESSM 203</td>
<td>Forest Trees of North America</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 300</td>
<td>Field Studies in Forest Ecosystems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 307</td>
<td>Forest Protection</td>
<td>3</td>
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<tr>
<td>ESSM 309</td>
<td>Forest Ecology</td>
<td>3</td>
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<tr>
<td>ESSM 310</td>
<td>Forest Tree Improvement and Regeneration</td>
<td>3</td>
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<td>ESSM 319</td>
<td>Principles of Forestry</td>
<td>4</td>
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<td>ESSM 324</td>
<td>Forest Measurements</td>
<td>2</td>
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<td>ESSM 405</td>
<td>Forest Resource Assessment and Management (W)</td>
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<td>ESSM 406</td>
<td>Natural Resources Policy</td>
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<td>Free electives $^2$</td>
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</table>

Total Semester Credit Hours: 120

1. To be selected in consultation with an advisor.
2. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
3. Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.

Rangeland Ecology and Management - BS, Ranch Management Option

Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments and sustainable production, conservation and function of land. Rangelands comprise approximately 50% of the land area of the United States and the world. Natural resources on rangelands provide many products and values for society including: livestock grazing, habitat for game and non-game wildlife, water for urban and agricultural uses, recreational opportunities, minerals, oil and gas. The expansiveness and diversity of rangelands require that knowledge and technology be drawn from numerous disciplines.

Employment opportunities are diverse. They include all aspects of natural resource management, including ranch management, environmental consulting, conservation and natural resource planning on private lands and with state and federal agencies. Students also find employment in agribusiness sales, marketing, agricultural finance real estate, consulting and reclamation. Students can also pursue professional careers in teaching agricultural science.

Two options in the Rangeland Ecology and Management curriculum provide the opportunity for specialization in a minor field.

Ranch Management Option

Designed for students preparing for careers in ranch management and agribusiness. This option emphasizes management and utilization of rangeland for livestock and wildlife production. It provides excellent preparation for students desiring to obtain a Master of Agriculture degree in ranch management. Employment opportunities are available on private ranches, businesses, and industries supporting ranches and with state and federal agencies.

Emphasis Areas

Ecology

Designed for students to explore and specialize in a diverse array of ecological topics. They study plants and animals and the ecological principles essential for effective conservation, management and restoration of the land and associated natural resources. They are prepared for careers in resource monitoring, management and conservation with state and federal agencies and the private sector.
**Environmental Science**

Designed for students preparing for professional careers in environmental management. The coursework includes a basic foundation of ecological sciences, plant taxonomy and rangeland management with emphasis on plants, water and soils. Job opportunities are available in environmental consulting firms, public utility companies, municipalities and federal environmental agencies. The curriculum provides a good foundation for students planning to pursue graduate studies in watershed management, environmental sciences, pollution control or waste management.

**Preveterinary Medicine**

Prepares students for admission to the professional program in veterinary medicine. Students planning to work in large animal practice would benefit from studies in rangeland ecology and management.

**Range/Soil Conservation**

Designed to qualify students as range management specialists or soil conservationists with the federal government. The curriculum will provide students with competitive ratings with federal Civil Service for positions with the Natural Resources Conservation Service, Forest Service and Bureau of Land Management. Various electives and work experience may be used to increase the rating score. Job opportunities are also available in private and state organizations.

**Watershed Resources**

For students preparing for a professional career in watershed management. Graduates qualify for employment as range management specialists and soil conservationists or, with proper selection of electives, as hydrologists. Opportunities are also available in environmental consulting firms, public utility companies, land reclamation firms, municipalities, secondary school education and private land management.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
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<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 481</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ESSM 302</td>
<td>Wildland Plants of North America</td>
<td>3</td>
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<tr>
<td>ESSM 303</td>
<td>Agroecology</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 304</td>
<td>or ESSM 304 or Rangeland Plant Taxonomy</td>
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<tr>
<td>ESSM 314</td>
<td>Principles of Rangeland Management Around the World</td>
<td>3</td>
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<tr>
<td>ESSM 315</td>
<td>Rangeland Inventory and Monitoring</td>
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<td>ESSM 316</td>
<td>Range Ecology</td>
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<tr>
<td>ESSM 317</td>
<td>Vegetation Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 415</td>
<td>Range Analysis and Management Planning 1</td>
<td>4</td>
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<tr>
<td>RENR 411</td>
<td>or Ecosystem Management</td>
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<tr>
<td>ANSC 105</td>
<td>General Animal Science</td>
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<tr>
<td>ANSC 108</td>
<td>General Animal Science</td>
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<tr>
<td>ANSC 302</td>
<td>Basic Beef Cattle Production</td>
<td>3</td>
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<tr>
<td>ANSC 320</td>
<td>Animal Nutrition and Feeding</td>
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<td>Select one from:</td>
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<tr>
<td>AGEC 350</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 318</td>
<td>Coupled Social and Ecological Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 404</td>
<td>Changing Natural Resource Policy</td>
<td>3</td>
</tr>
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<td>ESSM 406</td>
<td>Natural Resources Policy</td>
<td>3</td>
</tr>
<tr>
<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
<td>3</td>
</tr>
<tr>
<td>Emphasis Area electives 1</td>
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<tr>
<td>Electives</td>
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<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
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<tr>
<td>Select one from:</td>
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<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
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<tr>
<td>HORT 201</td>
<td>Horticultural Science and Practices &amp; HORT 202 and Horticultural Science and Practices Laboratory</td>
<td>4</td>
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<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>RENR 215</td>
<td>Fundamentals of Ecology-Laboratory</td>
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<tr>
<td>American history electives (p. 25) 2</td>
<td></td>
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</tr>
<tr>
<td>Communication electives (p. 22) 2</td>
<td></td>
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<tr>
<td>Creative arts elective (p. 24) 2</td>
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<tr>
<td>Government/Political science electives (p. 25) 2,3</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23) 2</td>
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<tr>
<td>Mathematics electives (MATH prefix required) (p. 22)</td>
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<td>6</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>

1 To be selected in consultation with an advisor.
The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor. Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.

Rangeland Ecology and Management
- BS, Rangeland Resources Option

Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments and sustainable production, conservation and function of land. Rangelands comprise approximately 50% of the land area of the United States and the world. Natural resources on rangelands provide many products and values for society including: livestock grazing, habitat for game and non-game wildlife, water for urban and agricultural uses, recreational opportunities, minerals, oil and gas. The expansiveness and diversity of rangelands require that knowledge and technology be drawn from numerous disciplines.

Employment opportunities are diverse. They include all aspects of natural resource management, including ranch management, environmental consulting, conservation and natural resource planning on private lands and with state and federal agencies. Students also find employment in agribusiness sales, marketing, agricultural finance real estate, consulting and reclamation. Students can also pursue professional careers in teaching agricultural science.

Two options in the Rangeland Ecology and Management curriculum provide the opportunity for specialization in a minor field.

Rangeland Resources Option

Designed for students preparing for careers in the private, state and federal sectors in the area of natural resources conservation and management. It also provides good preparation for graduate study leading to positions in extension, teaching, research and consulting. It allows maximum flexibility to orient a degree program towards specific career interests. Students are encouraged to develop an emphasis area by selecting 15 hours of directed elective courses in related disciplines. Several suggested emphasis areas for the Rangeland Resources Option follow.

Emphasis Areas

Ecology
Designed for students to explore and specialize in a diverse array of ecological topics. They study plants and animals and the ecological principles essential for effective conservation, management and restoration of the land and associated natural resources. They are prepared for careers in resource monitoring, management and conservation with state and federal agencies and the private sector.

Environmental Science
Designed for students preparing for professional careers in environmental management. The coursework includes a basic foundation of ecological sciences, plant taxonomy and rangeland management with emphasis on plants, water and soils. Job opportunities are available in environmental consulting firms, public utility companies, municipalities and federal environmental agencies. The curriculum provides a good foundation for students planning to pursue graduate studies in watershed management, environmental sciences, pollution control or waste management.

Preveternary Medicine
Prepares students for admission to the professional program in veterinary medicine. Students planning to work in large animal practice would benefit from studies in rangeland ecology and management.

Range/Soil Conservation
Designed to qualify students as range management specialists or soil conservationists with the federal government. The curriculum will provide students with competitive ratings with federal Civil Service for positions with the Natural Resources Conservation Service, Forest Service and Bureau of Land Management. Various electives and work experience may be used to increase the rating score. Job opportunities are also available in private and state organizations.

Teaching
For students majoring in rangeland ecology and management who wish to teach. Directed electives may be chosen so that, following this curriculum, the student is eligible to enter the induction year as a teacher of agricultural science under the Texas Education Agency Plan. Off-campus student teaching is required.

Watershed Resources
For students preparing for a professional career in watershed management. Graduates qualify for employment as range management specialists and soil conservationists or, with proper selection of electives, as hydrologists. Opportunities are also available in environmental consulting firms, public utility companies, land reclamation firms, municipalities, secondary school education and private land management.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSM 201</td>
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<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
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<td>ESSM 306</td>
<td>Plant Functional Ecology and Adaptation</td>
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<td></td>
<td>or ESSM 31 Biogeochemistry and Global Change</td>
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<tr>
<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
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<td>ESSM 351/RENR 405</td>
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<td>ESSM 481</td>
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<td>SCSC 301</td>
<td>Soil Science</td>
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Rangeland Ecology and Management Core Courses

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<td>ESSM 302</td>
<td>Wildland Plants of North America</td>
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<td>ESSM 303</td>
<td>Agrostology</td>
<td>3</td>
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<tr>
<td></td>
<td>or ESSM 30 Rangeland Plant Taxonomy</td>
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<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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<tr>
<td>ESSM 314</td>
<td>Principles of Rangeland Management Around the World</td>
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<tr>
<td>ESSM 315</td>
<td>Rangeland Inventory and Monitoring</td>
<td>1</td>
</tr>
<tr>
<td>ESSM 316</td>
<td>Range Ecology</td>
<td>3</td>
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<tr>
<td>ESSM 317</td>
<td>Vegetation Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 415</td>
<td>Range Analysis and Management Planning 1</td>
<td>4</td>
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<td>or RENR 410</td>
<td>Ecosystem Management</td>
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**Rangeland Resources Option**

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<td>Soil Morphology and Interpretations</td>
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Select two from:

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<tr>
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<td>Principles of Farm and Ranch Management</td>
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<tr>
<td>AGEC 350</td>
<td>Environmental and Natural Resource Policy</td>
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<tr>
<td>ESSM 318</td>
<td>Coupled Social and Ecological Systems</td>
<td></td>
</tr>
<tr>
<td>ESSM 404</td>
<td>Changing Natural Resource Policy</td>
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<td>ESSM 406</td>
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<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
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**Directed electives**

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<td>RENR 215</td>
<td>Fundamentals of Ecology-Laboratory</td>
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<tr>
<td>American history electives (p. 25) 2</td>
<td>6</td>
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<td>Communication electives (p. 22) 2</td>
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<tr>
<td>Creative arts elective (p. 24) 2</td>
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<tr>
<td>Government/Political science electives (p. 25) 2,3</td>
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<td>Language, philosophy and culture elective (p. 23) 2</td>
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<td>Mathematics electives (MATH prefix required) (p. 22)</td>
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**Total Semester Credit Hours**

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1. To be selected in consultation with an advisor.
2. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
3. Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.

---

**Renewable Natural Resources - BS**

**Professional Fields of Study and Department Heads**

Ecosystem Science and Management, Kathleen Kavanagh, Head
Recreation, Park and Tourism Sciences, Gary D. Ellis, Head
Wildlife and Fisheries Sciences, John B. Carey, Interim Head

**General Statement**

Three departments offer degrees in specific areas of natural resources management and conservation. Students may select one of these degree programs or a broad approach to natural resource education by pursuing the multi-department degree in Renewable Natural Resources.

**Renewable Natural Resources**

Renewable Natural Resources (RENR) is for students desiring a rigorous education in the study and management of sustainable ecosystems for a wide variety of resource values. The RENR program of study is comprised of a core of courses and two emphases. The goal of this core/emphasis structure is to provide students with an identity as a renewable natural resources specialist, while, at the same time, affording the flexibility for preparation for a variety of career tracks. One emphasis focuses on management and the other on policy. Technical electives prepare the students in chosen educational and career directions. The underlying goal of the RENR degree is to integrate the scientific issues of renewable natural resources. Graduates of this program will be able to articulate these issues verbally and in writing in their chosen career. Therefore, the RENR degree emphasizes verbal presentations and major papers as well as field-oriented activities.

The RENR programs are designed to help students prepare for careers in public and private organizations associated with the planning and use of natural resources and the environment. Possible employment includes areas such as multi-use land management, environmental assessment, resource inventory, natural resource planning, law, policy analysis and land remediation.

An emphasis may be selected in policy or management. The RENR degree consists of 120 credit hours: 42 university core, 42-45 common to both emphasis areas and 24-27 designated by the emphasis area and 9 free elective hours.

**RENR Areas of Emphasis**

The BS in Renewable Natural Resources includes two emphasis areas for students to select. The directed electives available from advisors are what differentiates the emphases.

**Management Emphasis**

Designed for an education in the scientific management of integrated natural resources. In today’s world, it is important to have college graduates prepared to deal with integrated systems, accounting for all of the separate aspects of the system. The management emphasis seeks to prepare the student to integrate concerns related to land, water, air, plants and wildlife into the management process. Students select 24 credit hours of directed electives from an approved list in consultation with their advisor. The remaining 9 credit hours are free electives.
Policy Emphasis

Designed for students desiring an education in natural resources policy. This emphasis incorporates knowledge from all renewable natural resources disciplines, which provides a foundation for decision-making related to the environment. Students will obtain an understanding of the behavior of institutions and organizations associated with natural resource management.

Professionals associated with natural resources need to consider legislative mandates, community interests, resource evaluation and competing uses, and conflict management techniques. This emphasis prepares the student for work in private industry, public and non-profit agencies, and graduate school. Students must select 24 hours of restricted electives from an approved list in consultation with their advisor. The remaining nine hours are free electives.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<td>Wildland Watershed Management</td>
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<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
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<td>ESSM 318</td>
<td>Coupled Social and Ecological Systems</td>
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<td>Geographic Information Systems for Resource Management</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<td>RENR 375</td>
<td>Conservation of Natural Resources</td>
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<td>RENR 410</td>
<td>Ecosystem Management</td>
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<tr>
<td>ESSM 102</td>
<td>Introduction to Natural Resources and Ecosystem Management</td>
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<td>ESSM 201</td>
<td>Exploring Ecosystem Science and Management</td>
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<tr>
<td>WFSC 101</td>
<td>Introduction to Wildlife and Fisheries</td>
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</tr>
<tr>
<td>ESSM 203</td>
<td>Forest Trees of North America</td>
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<td>ESSM 302</td>
<td>Wildland Plants of North America</td>
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<td>ESSM 303</td>
<td>Agrostology</td>
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<td>ESSM 304</td>
<td>Rangeland Plant Taxonomy</td>
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<td>WFSC 302</td>
<td>Natural History of the Vertebrates</td>
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<td>Natural Resources Policy</td>
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<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
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<td>WFSC 303</td>
<td>Fish and Wildlife Laws and Administration</td>
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<td>ESSM 320</td>
<td>Ecosystem Restoration and Management</td>
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<td>Biogeochemistry and Global</td>
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<td>WFSC 414</td>
<td>Ecology of Lakes and Rivers</td>
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<td>WFSC 428</td>
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<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
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<tr>
<td>BIOL 101</td>
<td>Botany</td>
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<tr>
<td>or BIOL 113 or Essentials in Biology</td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>RENR 215</td>
<td>Fundamentals of Ecology--Laboratory</td>
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<td>American history electives (p. 25) 3</td>
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<td>Communications electives (p. 22) 3</td>
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<tr>
<td>Government/Political science electives (p. 25) 4</td>
<td>6</td>
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<tr>
<td>Language, philosophy, and cultural elective (p. 23) 3</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td>120</td>
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</tbody>
</table>

1 Students will complete an internship, study abroad or independent research experience.
2 To be selected from an approved list in consultation with an advisor.
3 The graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
4 Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.
Spatial Sciences - BS

A degree in Spatial Sciences offers students the opportunity to obtain a career in a cutting-edge discipline at the intersection of environmental and spatial sciences. The spatial sciences combine multidisciplinary fields of scientific study with geospatial technologies including Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing. A spatial sciences graduate will possess an advanced knowledge of these technologies, experience in interpretation of aerial photographs and processing of satellite images, as well as a broad understanding of computer applications and database management. Graduates are capable of working as environmental and natural resource managers and possess the necessary skills to map geographical features, patterns, and changes. Furthermore, these individuals will be able to lead and conduct modern environmental management activities.

Through core and supporting coursework, students will learn to utilize the full potential of the spatial sciences in real-world problem solving. From real-time wildfire risk assessment to crime analysis, habitat mapping for endangered species, and evaluating environmental damage from natural disasters, the spatial sciences are an integral part of modern resource management.

Students in this degree program receive guidance from faculty advisors in their areas of interest, and meet regularly to discuss courses and career opportunities. The total number of credit hours required for graduation is 120.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
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<td>ESSM 201</td>
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<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
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<td>ESSM 306</td>
<td>Plant Functional Ecology and Adaptation or Biogeochemistry and Global Change</td>
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<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
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<td>ESSM 351/</td>
<td>Geographic Information Systems for Resource Management</td>
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<td>ESSM 317</td>
<td>Vegetation Management</td>
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<td>ESSM 319</td>
<td>Principles of Forestry</td>
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<td>ESSM 444</td>
<td>Remote Sensing of the Environment</td>
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<td>ESSM 459</td>
<td>Programming for Spatial Data Applications</td>
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<td>ESSM 461</td>
<td>Spatial Databases for Data Storage, Manipulation and Analysis</td>
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<td>ESSM 462/GEOG 462</td>
<td>Advanced GIS Analysis for Natural Resource Management</td>
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<td>ESSM 404 Changing Natural Resource Policy</td>
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<td>BIOL 113 Essentials in Biology</td>
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<td>RENR 215 Fundamentals of Ecology Laboratory</td>
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1 To be selected in consultation with an advisor.
2 The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
3 Credit by examination may be used to substitute 3 hours of POLS 206 or POLS 207.

Forestry - Minor

The Department of Ecosystem Science and Management offers a minor in Forestry.
### Program Requirements

<table>
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<tr>
<th>Code</th>
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<td>Forest Trees of North America</td>
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<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 319</td>
<td>Principles of Forestry</td>
<td>4</td>
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<td>ESSM 324</td>
<td>Forest Measurements</td>
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<tr>
<td><strong>Elective Courses</strong></td>
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<tr>
<td>ESSM 300</td>
<td>Field Studies in Forest Ecosystems</td>
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<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
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<td>ESSM 309</td>
<td>Forest Ecology</td>
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<td>ESSM 310</td>
<td>Forest Tree Improvement and Regeneration</td>
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<td>ESSM 405</td>
<td>Forest Resource Assessment and Management</td>
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<td>Natural Resources Policy</td>
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</tbody>
</table>

Students must make a grade of “C” or better in all courses.

Minimum of 18 hours required.

### Rangeland Ecology and Management - Minor

The Department of Ecosystem Science and Management offers a minor in Rangeland Ecology and Management.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Required Courses</strong></td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>ESSM 302</td>
<td>Wildland Plants of North America</td>
<td></td>
</tr>
<tr>
<td>ESSM 303</td>
<td>Agrostology</td>
<td></td>
</tr>
<tr>
<td>ESSM 304</td>
<td>Rangeland Plant Taxonomy</td>
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<tr>
<td>ESSM 314</td>
<td>Principles of Rangeland Management Around the World</td>
<td>3</td>
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<tr>
<td>Select three of the following:</td>
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<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 316</td>
<td>Range Ecology</td>
<td></td>
</tr>
<tr>
<td>ESSM 317</td>
<td>Vegetation Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 320</td>
<td>Ecosystem Restoration and Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 416</td>
<td>Fire Ecology and Natural Resource Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 420</td>
<td>Ecological Restoration of Wetland and Riparian Systems</td>
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<tr>
<td>Total Semester Credit Hours</td>
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</table>

Students must make a grade of “C” or better in all courses.

### Spatial Sciences - Minor

The minor in Spatial Sciences requires a minimum of 15 hours.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Program Requirements</strong></td>
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<tr>
<td>ESSM 444</td>
<td>Remote Sensing of the Environment</td>
<td>3</td>
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<tr>
<td>ESSM 462/ GEOG 462</td>
<td>Advanced GIS Analysis for Natural Resource Management</td>
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<td>Select one of the following:</td>
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<tr>
<td>ESSM 351/ Geographic Information Systems</td>
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<tr>
<td>RENR 405</td>
<td>for Resource Management</td>
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<tr>
<td>ESSM 459</td>
<td>Programming for Spatial Data Applications</td>
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<tr>
<td>ESSM 461</td>
<td>Spatial Databases for Data Storage, Manipulation and Analysis</td>
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<tr>
<td>ESSM 464</td>
<td>Spatial Project Management</td>
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<tr>
<td>GEOL 352/ GEOG 352</td>
<td>GNSS in the Geosciences</td>
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<td>Total Semester Credit Hours</td>
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</tr>
</tbody>
</table>

Students must complete a minimum of 6 hours in residence at the 300-400 level.

Students must maintain a 2.0 or above in minor curriculum.

### Watershed - Certificate

The goal of the watershed certificate is to provide a rigorous and high quality program that will produce graduates capable of working as a professional in watershed or hydrology fields, but with very solid scientific and ecological foundation. Graduates will be qualified to work in government or consulting or if they choose, be prepared to pursue graduate training in any watershed/hydrology science program. Training will be built on a solid foundation in watershed management and hydrology.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Requirements</strong></td>
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<tr>
<td>Select two of the following:</td>
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<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
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<tr>
<td>ESSM 316</td>
<td>Range Ecology</td>
<td></td>
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<tr>
<td>ESSM 317</td>
<td>Vegetation Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 320</td>
<td>Ecosystem Restoration and Management</td>
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</tr>
<tr>
<td>ESSM 416</td>
<td>Fire Ecology and Natural Resource Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 420</td>
<td>Ecological Restoration of Wetland and Riparian Systems</td>
<td>1</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>15</td>
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</tr>
</tbody>
</table>

Students must complete a minimum of 6 hours in residence at the 300-400 level.

Students must maintain a 2.0 or above in minor curriculum.
The Department of Entomology at Texas A&M University is one of the top entomology departments in the United States. We offer two undergraduate degrees, a Bachelor of Science degree in Entomology and a Bachelors of Science degree in Forensic and Investigative Sciences (FIVS). Our FIVS degree is the only bachelor’s degree in the state of Texas that is nationally accredited by the Forensic Science Education Programs Accreditation Commission (FEPAC) of the American Academy of Forensic Sciences. Both undergraduate degrees provide students with the necessary curriculum requirements to pursue graduate study in entomology, as well as in other professional fields, such as law and medicine.

Faculty

Adelman, Zachary N, Associate Professor
Entomology
PHD, Colorado State University, 2000

Behmer, Spencer T, Professor
Entomology
PHD, University of Arizona, 1998

Bernal, Julio S, Professor
Entomology
PHD, University of California, Riverside, 1995

Bowling, Robert, Assistant Professor & Extension Specialist
Entomology
PHD, Kansas State University, 2003

Brewer, Michael, Associate Professor
Entomology
PHD, University of California, Riverside, 1990

Brundage, Adrienne L, Assistant Lecturer
Entomology
PHD, Texas A&M University, 2012

Bynum, Edsel, Associate Professor & Extension Specialist
Entomology
PHD, Texas Tech University, 2003

Coates, Craig J, Instructional Associate Professor
Entomology
PHD, Australian National University, 1997

Coulson, Robert N, Professor
Entomology
PHD, University of Georgia, 1969

Eubanks, Micky D, Professor
Entomology
PHD, University of Maryland, 1997

Hamer, Gabriel L, Assistant Professor
Entomology
PHD, Michigan State University, 2008

Heinz, Kevin M, Professor
Entomology
PHD, University of California, Riverside, 1989

Johnston, J S, Professor
Entomology
PHD, University of Arizona, 1972

Knutson, Allen, Professor & Extension Entomologist
Entomology
PHD, Texas A&M University, 1987

McCutchen, Billy, AgriLife Professor
Entomology
PHD, University of California, Davis, 1993

Medina, Raul F, Professor
Entomology
PHD, University of Maryand, 2005

Merchant, Michael, Professor & Urban Extension Entomologist
Entomology
PHD, Texas A&M University, 1989

Myles, Kevin M, Associate Professor
Entomology
PHD, Colorado State University, 2003

Oswald, John D, Professor
Entomology
PHD, Cornell University, 1991

Parajulee, Megha, Professor
Entomology
PHD, University of Wisconsin - Madison, 1994

Pietrantonio, Patricia, Professor
Entomology
PHD, University of California, Riverside, 1995

Porter, Robert, Professor & Extension Specialist
Entomology
PHD, Mississippi State University, 1993

Puckett, Robert, Assistant Professor & Extension Specialist
Entomology
PHD, Texas A&M University, 2008
• Bachelor of Science in Forensic and Investigative Sciences, Science Emphasis (p. 165)

**Minors**

• Entomology Minor (p. 166)

**Certificates**

• Public Health Entomology Certificate (p. 167)

### Entomology - BS

Entomology is a basic and applied science of insects and their relatives such as ticks and mites. Insects are the most numerous and diverse forms of life on earth; they are essential constituents of virtually every terrestrial and aquatic ecosystem. While society benefits from the many diverse roles played by the vast majority of insects, some species may become limiting factors in the production, processing and storage of our food and fiber crops, and to the health and well being of humans and animals. The knowledge and skills possessed by entomologists are essential components of modern integrated pest management strategies designed to safely and efficiently produce adequate food supplies for a continuously expanding world population, and to impede the transmission of insect-borne diseases, while at the same time protecting our endangered species and fragile ecosystems.

The Bachelor of Science degree in Entomology leads to a wide array of career paths with strong employment demands among corporate and private agribusiness; urban pest management companies; scientific and technical organizations; public health agencies; local, state and federal governments; and international organizations. In addition, employment opportunities exist in areas such as forensic entomology, conservation biology, environmental quality, food quality, regulatory inspection, public health and many more. Our curriculum is sufficiently flexible such that a student, in consultation with the academic advisor, may tailor the degree to meet their individual academic goals, including requirements for graduate school, professional schools in the health career areas (medical, veterinary, dental) as well as providing the analytical skills needed for law school. Our department also participates in the Texas A&M accelerate online program for teaching certification, which is an innovative approach to training Texas secondary science teachers to gain the background education needed to prepare for certification to teach science grades 8–12.

Students majoring in related areas such as agronomy, animal science, horticulture, biology, genetics and biomedical sciences may wish to consider augmenting their knowledge base and broaden their career opportunities by electing to either double major or to minor in entomology. Interested students should contact the departmental Undergraduate Advisor for additional information on these options.

### Program Requirements

**First Year**

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGLS 101 Modern Agricultural Systems and Renewable Natural Resources</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 111 Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101 Fundamentals of Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111 Fundamentals of Chemistry Laboratory I</td>
<td>1</td>
</tr>
</tbody>
</table>

**Majors**

- Bachelor of Science in Entomology (p. 161)
- Bachelor of Science in Forensic and Investigative Sciences, Pre-Law Emphasis (p. 163)
ENTO 201  General Entomology 3
MATH 140 or MATH 141  Mathematics for Business and Social Sciences or Finite Mathematics 3

Semester Credit Hours 15

Spring
CHEM 102  Fundamentals of Chemistry II 3
CHEM 112  Fundamentals of Chemistry Laboratory II 1
BIOL 112  Introductory Biology II 4
Select one of the following: 3
MATH 131 Mathematical Concepts—Calculus
MATH 142 Business Calculus
MATH 167 Explorations in Mathematics
PHIL 240 Introduction to Logic
Communication elective (p. 22) 3

Semester Credit Hours 14

Second Year
Fall
ENTO 482  Occupational and Professional Development 2
POLS 206  American National Government 3
CHEM 222  Elements of Organic and Biological Chemistry or CHEM 227 Elements of Organic Chemistry I
American History elective (p. 25) 3
Social and behavioral sciences elective (p. 25) 3
Elective 1

Semester Credit Hours 15

Spring
POLS 207  State and Local Government 3
American history elective (p. 25) 3
Communication elective (p. 22) 3
Language, philosophy and culture elective (p. 23) 3
Technical elective 2 3

Semester Credit Hours 15

Third Year
Fall
ENTO 305  Evolution of Insect Structure 3
ENTO 306  Insect Physiology 3
Elective 3
Technical electives 2 7

Semester Credit Hours 16

Spring
ENTO 301  Biodiversity and Biology of Insects 4
ENTO 424  Insect Ecology 3
GENE 301  Comprehensive Genetics and Comprehensive Genetics Laboratory 4
Creative arts elective (p. 24) 3
ENTO 481  Seminar 1

Semester Credit Hours 15

Fourth Year
Fall
ENTO 428  Insect Biotechnology 3

ENTO 429  Insect Biotechnology Laboratory 1
Elective 3
Technical electives 2 7

Semester Credit Hours 14

Spring
ENTO 435  Case Studies in Problem Solving 3
ENTO 484 or ENTO 491  Professional Internship or Research 2
Electives 5
Technical electives 2 6

Semester Credit Hours 16

Total Semester Credit Hours 120

1 To be selected in consultation with student’s academic advisor in the department. Six hours of international and cultural diversity electives are required for graduation; these courses may fulfill other degree requirements as well. See the list of approved courses.
2 Technical electives must be selected in consultation with the student’s advisor or from the current list of approved electives published by the department. See Technical Electives table.

Additional Requirements for Baccalaureate Degree
• Foreign Language (two years same language in HS, one yr college)
• Writing Intensive Courses (two courses designated W in major or one W and one C course in major)
• International and Cultural Diversity Courses (two courses for six credit hours)

Technical Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
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<tr>
<td>AGEC 314</td>
<td>Marketing Agricultural and Food Products</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 330</td>
<td>Financial Management in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 340</td>
<td>Agribusiness Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 335</td>
<td>Water and Soil Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSM 337</td>
<td>Technology for Environmental and Natural Resource Engineering</td>
<td>3</td>
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<tr>
<td>ALED 440</td>
<td>Leading Change</td>
<td>3</td>
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<tr>
<td>ANSC 107</td>
<td>General Animal Science</td>
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<tr>
<td>ANSC 108</td>
<td>General Animal Science</td>
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<tr>
<td>ANSC 305</td>
<td>Animal Breeding</td>
<td>3</td>
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<tr>
<td>ANSC 307/ FSTC 307</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ANSC 303/ NUTR 303</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 310</td>
<td>Behavior and Management of Domestic Animals</td>
<td>3</td>
</tr>
<tr>
<td>ANSC 318</td>
<td>Feeds and Feeding</td>
<td>3</td>
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<tr>
<td>ANSC 320</td>
<td>Animal Nutrition and Feeding</td>
<td>3</td>
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<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
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<td>BESC 401</td>
<td>Bioenvironmental Microbiology</td>
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<tr>
<td>BESC 402</td>
<td>Microbial Processes in Bioremediation</td>
<td>3</td>
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<tr>
<td>BICH 303</td>
<td>Elements of Biological Chemistry</td>
<td>3</td>
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<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
<td>3</td>
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<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
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<tr>
<td>BICH 431/GENE 431</td>
<td>Molecular Genetics</td>
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<tr>
<td>BIOL 206</td>
<td>Introductory Microbiology</td>
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<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
<td>3</td>
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<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
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<td>BIOL 320</td>
<td>Integrated Human Anatomy and Physiology II</td>
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<td>BIOL 351</td>
<td>Fundamentals of Microbiology</td>
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<td>BIOL 357</td>
<td>Ecology</td>
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<td>BIOL 358</td>
<td>Ecology Laboratory</td>
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<td>BIOL 413</td>
<td>Cell Biology</td>
<td>3</td>
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<td>BIOL 456</td>
<td>Medical Microbiology</td>
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<td>CHEM 228</td>
<td>Organic Chemistry II</td>
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<td>CHEM 238</td>
<td>Organic Chemistry Laboratory</td>
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<td>COMM 203</td>
<td>Public Speaking</td>
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<td>ENTO 208 - ENTO 299 (p. 800)</td>
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<td>ENTO 313</td>
<td>Biology of Insects</td>
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<tr>
<td>ENTO 315</td>
<td>Biotechnology and Society</td>
<td>3</td>
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<td>ENTO 320</td>
<td>Honey Bee Biology</td>
<td>3</td>
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<td>ENTO 322</td>
<td>Insects and Human Society</td>
<td>3</td>
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<td>ENTO 401</td>
<td>Principles of Integrated Pest Management</td>
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</tr>
<tr>
<td>ENTO 402</td>
<td>Field-Crop Insects</td>
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<td>ENTO 403</td>
<td>Urban Entomology</td>
<td>3</td>
</tr>
<tr>
<td>ENTO 423</td>
<td>Medical Entomology</td>
<td>3</td>
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<tr>
<td>ENTO 431/ FIVS 431</td>
<td>The Science of Forensic Entomology</td>
<td>3</td>
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<tr>
<td>ENTO 432/ FIVS 432</td>
<td>Applied Forensic Entomology</td>
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<tr>
<td>ENTO 485</td>
<td>Directed Studies</td>
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<tr>
<td>ENTO 489</td>
<td>Special Topics in...</td>
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<tr>
<td>FSTC 326/ DASC 326</td>
<td>Food Bacteriology</td>
<td>3</td>
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<tr>
<td>FSTC 327/ DASC 327</td>
<td>Food Bacteriology Lab</td>
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<tr>
<td>GENE 405/ BIMS 405</td>
<td>Mammalian Genetics</td>
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<td>GENE 406/ BIOL 406</td>
<td>Bacterial Genetics</td>
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<tr>
<td>GENE 412</td>
<td>Population and Ecological Genetics</td>
<td>3</td>
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<td>HORT 201</td>
<td>Horticultural Science and Practices</td>
<td>3</td>
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<td>HORT 301</td>
<td>Garden Science</td>
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<td>HORT 308</td>
<td>Plants for Sustainable Landscapes</td>
<td>3</td>
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<tr>
<td>HORT 315</td>
<td>Issues in Horticulture</td>
<td>3</td>
</tr>
<tr>
<td>MEPS 313</td>
<td>Introduction to Plant Physiology</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 303/ ANSC 303</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
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<tr>
<td>PHYS 202</td>
<td>College Physics</td>
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<tr>
<td>PLPA 301</td>
<td>Plant Pathology</td>
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<td>Plant Pathology Laboratory</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<tr>
<td>SCSC 105</td>
<td>World Food and Fiber Crops</td>
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<td>SCSC 301</td>
<td>Soil Science</td>
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<td>SCSC 304</td>
<td>Plant Breeding and Genetics</td>
<td>3</td>
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<tr>
<td>SCSC 405</td>
<td>Soil and Water microbiology</td>
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<td>SCSC 422</td>
<td>Soil Fertility and Plant Nutrient Management</td>
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<td>SCSC 455</td>
<td>Environmental Soil and Water Science</td>
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<td>STAT 302</td>
<td>Statistical Methods</td>
<td>3</td>
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<td>VTPB 405</td>
<td>Biomedical Microbiology</td>
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<td>VTPB 409</td>
<td>Introduction to Immunology</td>
<td>3</td>
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<tr>
<td>VTPB 487/ BIOL 487</td>
<td>Biomedical Parasitology</td>
<td>4</td>
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</tbody>
</table>

**Forensic and Investigative Sciences - BS, Pre-Law Emphasis**

Forensic and Investigative Sciences, an accredited program by the Forensic Science Education Programs Accreditation Commission (FEPAC), is a major offered by the Department of Entomology and is a growing area of interest for students seeking to gain entry into careers that deal with the collection, preservation, processing and use of evidentiary information to solve problems. A life sciences-based education, which develops skills in problem solving and critical thinking, is essential for career opportunities in this field. Forensic and investigative scientists rely upon state-of-the-art scientific discoveries and technologies as tools to seek answers to critical questions in a variety of settings. Molecular, organismal, environmental, and ecological sources of information are often analyzed and interpreted in industrial, regulatory, legal, medical and associated professions. Graduates will be competitive for employment opportunities in quality assurance laboratories, homeland security and investigative services at local, state and national levels. Graduates will also be well prepared for opportunities to enter post-graduate studies or professional schools including medicine, law, and veterinary medicine.

Interactions with and among plants, animals and microbes occur regularly. These interactions impact public and environmental health and require life science-based forensic and investigative science to improve the quality of life. Homeland security, criminal investigation, environmental quality, agricultural and public health offer careers for students with forensic and investigative skills. Students can also pursue avenues to forensic careers through degree programs in specialty areas such as chemistry, anthropology, physics, computer science and business.

Forensic and investigative sciences also operate at the crossroads of science and the legal profession, and provide opportunities for students to consider pre-law preparation. There are growing demands for attorneys with knowledge and understanding of science and research to address legal issues and cases where the interpretation of science and/or scientific data and analyses are pivotal. Law schools often seek
candidates with diverse backgrounds and interests, and they look closely at curricula that stress analytical and problem-solving skills, critical reading abilities, writing skills, oral communication and listening abilities, general research skills, and task organization and management skills. The Forensic and Investigative Sciences program provides students with opportunities to build these essential skills and knowledge areas through a combination of required and elective courses.

The Forensic and Investigative Sciences program requires students to earn a grade of C or better in all courses within the program curriculum.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forensic and Investigative Sciences Core Requirements</strong></td>
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</tr>
<tr>
<td>FIVS 205</td>
<td>Introduction to Forensic and Investigative Sciences</td>
<td>3</td>
</tr>
<tr>
<td>FIVS 308</td>
<td>Forensic Implications of Inheritance</td>
<td>4</td>
</tr>
<tr>
<td>FIVS 316</td>
<td>Biotechnology and Forensics</td>
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<td>Forensic Soil Science</td>
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<td>FIVS 415</td>
<td>Practice and Principles of Science and Law</td>
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<td>FIVS 435</td>
<td>Case Studies in Problem Solving ¹</td>
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<td>FIVS 481</td>
<td>Seminar ¹</td>
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<td>FIVS 482</td>
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<td>MATH 141</td>
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<td>Modern Agricultural Systems and Renewable Natural Resources</td>
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<td>AGEC 315</td>
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<td>AGEC 344</td>
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<td>AGEC 350</td>
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<td>ECON 322</td>
<td>Applied Microeconomic Theory</td>
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<td>MGMT 209</td>
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<td>POLS 356</td>
<td>Law, Politics and Policy ²</td>
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<td>Public Speaking</td>
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<td>Argumentation and Debate</td>
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<td>COMM 305</td>
<td>Theories of Communication</td>
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<td>PSYC 354</td>
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<td>SOCI 304</td>
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<td>ALED 440</td>
<td>Leading Change</td>
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<tr>
<td>FIVS 421</td>
<td>Latent Print Processing</td>
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Forensic and Investigative Sciences - BS, Science Emphasis

Forensic and Investigative Sciences, an accredited program by the Forensic Science Education Programs Accreditation Commission (FEPAC), is a major offered by the Department of Entomology and is a growing area of interest for students seeking to gain entry into careers that deal with the collection, preservation, processing and use of evidentiary information to solve problems. A life sciences-based education, which develops skills in problem solving and critical thinking, is essential for career opportunities in this field. Forensic and investigative scientists rely upon state-of-the-art scientific discoveries and technologies as tools to seek answers to critical questions in a variety of settings. Molecular, organismal, environmental, and ecological sources of information are often analyzed and interpreted in industrial, regulatory, legal, medical and associated professions. Graduates will be competitive for employment opportunities in quality assurance laboratories, homeland security and investigative services at local, state and national levels. Graduates will also be well prepared for opportunities to enter post-graduate studies or professional schools including medicine, law, and veterinary medicine.

Interactions with and among plants, animals and microbes occur regularly. These interactions impact public and environmental health and require life science-based forensic and investigative science to improve the quality of life. Homeland security, criminal investigation, environmental quality, agricultural and public health offer careers for students with forensic and investigative skills. Students can also pursue avenues to forensic careers through degree programs in specialty areas such as chemistry, anthropology, physics, computer science and business.

Forensic and investigative sciences also operate at the crossroads of science and the legal profession, and provide opportunities for students to consider pre-law preparation. There are growing demands for attorneys with knowledge and understanding of science and research to address legal issues and cases where the interpretation of science and/or scientific data and analyses are pivotal. Law schools often seek candidates with diverse backgrounds and interests, and they look closely at curricula that stress analytical and problem-solving skills, critical reading abilities, writing skills, oral communication and listening abilities, general research skills, and task organization and management skills. The Forensic and Investigative Sciences program provides students with opportunities to build these essential skills and knowledge areas through a combination of required and elective courses.

The Forensic and Investigative Sciences program requires students to earn a grade of C or better in all courses within the program curriculum.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<td>FIVS 205</td>
<td>Introduction to Forensic and Investigative Sciences</td>
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<td>FIVS 481</td>
<td>Seminar</td>
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<td>FIVS 482</td>
<td>Occupational and Professional Development</td>
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<td>FIVS 484</td>
<td>Professional Internship or FIVS 491</td>
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<td><strong>Natural Science Core Requirements</strong></td>
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<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
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<td>CHEM 227 &amp; CHEM 237</td>
<td>Organic Chemistry I and Organic Chemistry Laboratory</td>
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</table>
**Entomology - Minor**

The minor in Entomology is available to all students enrolled at Texas A&M University. The courses listed constitute the minimum 17 hours required for a minor in Entomology.

1. Students must earn a grade of C or better in each course used for the minor.
2. Prerequisite Courses: All prerequisites for each core and elective course also must be met. Prerequisite courses will not be applied to the minor requirements and do not count toward the number of hours needed to complete the minor. Please refer to the Texas A&M University Undergraduate Catalog for a listing of course prerequisites.
3. Availability of courses and minor recognition: The Department of Entomology cannot guarantee the availability of the courses required to meet the minor requirements. Successful completion of the minor will be certified by a degree audit in Howdy during the semester of the student’s graduation. The minor will be recognized after graduation on the student’s transcript, but not on the student’s diploma.

Students pursuing the Minor in Entomology (http://entomology.tamu.edu/entomology-academic-program/entomology-minor) are to complete the minor application form and submit the
document to the Department of Entomology Advising Office in 404 Minnie Belle Heep Building (HPCT).

Program Requirements

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<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<td>Core Courses 1</td>
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<tr>
<td>ENTO 201</td>
<td>General Entomology 1</td>
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<tr>
<td>or ENTO 208/209</td>
<td>or Veterinary Entomology</td>
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<td>ENTO 482</td>
<td>Occupational and Professional Development 1</td>
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<td>ENTO 301</td>
<td>Biodiversity and Biology of Insects 1</td>
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<tr>
<td>or ENTO 32</td>
<td>or Insects and Human Society</td>
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Directed Electives

Select from the following list:

- ENTO 300/ WFSC 300 | Field Studies |
- ENTO 305 | Evolution of Insect Structure |
- ENTO 306 | Insect Physiology |
- ENTO 315 | Biotechnology and Society |
- ENTO 320 | Honey Bee Biology |
- ENTO 401 | Principles of Integrated Pest Management |
- ENTO 402 | Field-Crop Insects |
- ENTO 403 | Urban Entomology |
- ENTO 423 | Medical Entomology |
- ENTO 424 | Insect Ecology |
- ENTO 428 | Insect Biotechnology |
- ENTO 429 | Insect Biotechnology Laboratory |
- ENTO 431/ FIVS 431 | The Science of Forensic Entomology |
- ENTO 432/ FIVS 432 | Applied Forensic Entomology |
- ENTO 435 | Case Studies in Problem Solving |
- ENTO 450/ WFSC 450 | Caribbean Conservation |
- ENTO 451/ WFSC 451 | Caribbean Research Seminar |
- ENTO 481 | Seminar |
- ENTO 484 | Professional Internship |
- ENTO 485 | Directed Studies |
- ENTO 489 | Special Topics in... |
- ENTO 491 | Research |

Total Semester Credit Hours 17

1 Substitutions are not allowed for core courses.

Students are encouraged to visit the Department of Entomology Advising Office in 404 Minnie Belle Heep Building (HPCT), West Campus, to select the appropriate directed elective courses based on their individual educational and career interests.

Students must earn a grade of C or better in each course used for the minor.

Public Health Entomology - Certificate

Population growth and distribution predicted over future decades pose increased risks of disease outbreaks and emergence of new diseases worldwide. Scientists from many disciplines, physicians, veterinarians, health-care practitioners, public health workers and policy makers are needed to provide public health surveillance, make new discoveries, and find solutions to address these risks.

This certificate offers a 15 credit-hour concentration in Public Health Entomology focused on insects and other arthropods that serve as vectors and reservoirs of disease pathogens, and are responsible for the direct and indirect causation of disease.

Employment opportunities in the public health sector include environmental and health service agencies, mosquito control districts, the Centers for Disease Control and Prevention (CDC), the Department of Defense, the World Health Organization, and the PanAmerican Health Organization.

Students completing this certificate will be competitive for employment upon graduation, for graduate programs in related disciplines, such as Master's programs in Public Health, Epidemiology, and Entomology, as well as professional schools.

Eligibility Requirements for Entrance:

1. Completion of a minimum of one (1) course from Category I and II with a grade of "B" or better and a cumulative TAMU GPA of 2.0+
2. Students must complete and submit application before completion of 75 credit hours.

Program Requirements

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<tr>
<th>Code</th>
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<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
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<td>ENTO 210</td>
<td>Global Public Health Entomology</td>
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<td>VTPB 221</td>
<td>Great Diseases of the World</td>
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| CATEGORY II                                                                 |
| Select one of the following: |
| ENTO 208 | Veterinary Entomology |
| & ENTO 209and Veterinary Entomology Laboratory |
| ENTO 423 | Medical Entomology |

| CATEGORY III                                                                 |
| Select one of the following: |
| ENTO 403 | Urban Entomology |
| HLTH 354 | Medical Terminology for the Health Professions |
| PHLT 302 | Foundations of Public Health |
| PHLT 305 | Epidemiology in Public Health |
| VIBS 204 | Fundamentals of Food Toxicology and Safety |
| VIBS 413 | Introduction to Epidemiology |
| VTPB 409 | Introduction to Immunology |
WFSC 327/ Wildlife Diseases  
VTPB 301  

cATEGORY IV  
ENTO 425  Disease Ecology  

Total Semester Credit Hours  15

Eligibility Requirements for Application and Entrance:

• Complete a minimum of one course from both Category I and Category II with a grade of "B" or better and a cumulative Texas A&M University 2.0 GPA or better
• Students must complete and submit application before completion of 75 total credit hours.

To Complete the Certification, Students Must:

• Successfully complete courses in Category I-III PRIOR to enrollment in Category IV ENT0 425
• Complete all courses within the certification with a minimum grade of "C"
• Earn a cumulative 3.0 GPA or better in the certificate courses
• Complete exit survey
• Meet the minimum qualifications for graduation as defined by Texas A&M University including a 2.0 cumulative GPA

For additional information and to discuss the scheduling of these courses upon successful completion of your entrance requirements, please contact a member of the Entomology Academic Advising Team to schedule an appointment to submit your Public Health Certificate Application. (http://entomology.tamu.edu/wp-content/uploads/sites/12/2016/07/CERTIFICATE-IN-PUBLIC-HEALTH-ENTOMOLOGY_7-2016.pdf)

Department of Horticultural Sciences

Horticulture encompasses a unique blend of art, science and technology. Horticultural crops include trees, shrubs, tropical plants, ornamental grasses, herbs, flowers, fruits, vegetables and nuts which are grown and utilized throughout the world. The Department of Horticultural Sciences offers two undergraduate degrees: a Bachelor of Science in Horticulture and a Bachelor of Arts in Horticulture. Our flexible degree plans enable students opportunities to develop programs tailored to their unique career goals. The horticulture industry is one of the largest agricultural industries in the state and offers graduates a multitude of diverse career opportunities.

Majors

• Bachelor of Arts in Horticulture (p. 168)
• Bachelor of Science in Horticulture (p. 169)

Minors

• Horticulture Minor (p. 170)

Certificates

• Enology Certificate (p. 170)

Horticulture - BA

This degree blends traditional horticulture with the benefits derived from the human association with plants. This degree offers students the option of pairing a horticulture degree with electives in social sciences, business, education, art and design. Creative opportunities range from planning gala events, to designing tranquil gardens, to constructing educational programs for school gardens to pursuing advanced degrees. Graduates may find themselves working in exciting environments including botanical gardens, international flower markets or upscale resorts.

Program Requirements

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<td>HORT 203</td>
<td>Floral Design</td>
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<td>HORT 281</td>
<td>Horticulture as a Profession.</td>
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<td>HORT 315</td>
<td>Issues in Horticulture</td>
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<td>HORT 335</td>
<td>Sociohorticulture</td>
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<td>HORT 400</td>
<td>Field Studies in Horticulture</td>
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<td>Principles of Design</td>
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<td>HORT 332</td>
<td>Horticulture Landscape Graphics</td>
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<td>HORT 432</td>
<td>Horticulture Landscape Design</td>
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<td>HORT 442</td>
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<td>HORT 451</td>
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<td>HORT 452</td>
<td>Floral Design: Weddings and Personal Flowers</td>
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<td>HORT 453</td>
<td>Floral Art</td>
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<td>HORT 454</td>
<td>Special Event Design and Production</td>
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<td>Horticulture Management and Marketing</td>
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<td>HORT 425</td>
<td>Landscape Maintenance and Construction</td>
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<td>HORT 426</td>
<td>International Floriculture Marketing</td>
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Support Courses

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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<td>Art or Art History</td>
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Select one of the following:

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<tr>
<td>ARTS 150</td>
<td>Art History Survey II</td>
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</table>
Horticulture - BS

This degree is designed to provide students with the knowledge and skills needed for production, management and marketing of horticultural and floriculture crops. This degree also offers students with strong interests in science and/or technology opportunities in research related fields including preparation for graduate studies. Career prospects range from producing specialty herb crops for upscale restaurants, to managing landscape businesses for growing communities, to marketing fruits and vegetables for healthier lifestyles. Many former students are self-employed, owning their own greenhouse, nursery or landscape operation. Others work in upper management of large corporations or travel the world developing future horticultural crops.

Program Requirements

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>HORT</td>
<td>Horticultural Science Core Courses</td>
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<td>HORT 201</td>
<td>Horticultural Science and Practices</td>
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<td>HORT 281</td>
<td>Horticulture as a Profession.</td>
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<td>HORT 315</td>
<td>Issues in Horticulture</td>
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<td>HORT 326</td>
<td>Plant Propagation</td>
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<td>HORT 481</td>
<td>Seminar</td>
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<td>High Impact Learning</td>
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<td>HORT 400 Field Studies in Horticulture</td>
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<td>HORT 484 Internship</td>
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<td>HORT 485 Directed Studies</td>
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<td>HORT Study Abroad</td>
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<td>Horticulture Crop Production</td>
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<td>HORT 319 Fruit and Nut Production</td>
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<td>HORT 325 Vegetable Crop Production</td>
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<td>HORT 418 Nut Culture</td>
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<td>HORT 419 Viticulture and Small Fruit Culture</td>
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<td>HORT 420 Concepts of Wine Production</td>
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<td>HORT 423 Tropical Horticulture</td>
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<td>HORT 431 Nursery Production and Management</td>
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<td>Horticulture Management and Marketing</td>
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<td>HORT 309 Interior Plants</td>
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<td>HORT 425 Landscape Maintenance and Construction</td>
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<td>HORT 426 International Floriculture Marketing</td>
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<td></td>
<td>HORT 428 Greenhouse Operation and Management</td>
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<tr>
<td></td>
<td>HORT 431 Nursery Production and Management</td>
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<td>Plant Identification / Characterization</td>
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<td>HORT 306 Trees and Shrubs for Sustainable Built Environments</td>
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<tr>
<td></td>
<td>HORT 308 Plants for Sustainable Built Landscapes</td>
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</table>
Horticulture - Minor

An undergraduate minor in Horticulture provides students a concentration of courses that focus on areas of horticulture and floriculture. These may range from a broad based, comparative perspective to a narrower application within the field. Students may choose such diverse topics as fruit and vegetable production, enology, greenhouse and nursery management, floral and landscape design, science and biotechnology, urban and environmental horticulture and much more. Earning a minor in Horticulture provides students with the skills required to have a basic working knowledge in the field of Horticulture.

Program Requirements

**Code** | **Title** | **Semester Credit Hours**
--- | --- | ---
HORT 201 | Horticultural Science and Practices | 3

Upper-level requirement | 9

Select from HORT 300 to 499 (p. 844)

Electives | 6

Select from HORT 100 to 499 (p. 844)

Total Semester Credit Hours | 18

Students must make a grade of “C” or better in all courses and must be in good academic standing with a GPA of 2.250 or above.

Enology - Certificate

**Overview**

The Enology Certificate, offered by the Department of Horticultural Sciences, contains 15 hours of concentrated study in the areas of viticulture, pre- and post-fermentation wine making processes, wine etiquette, and sensory evaluation. The certificate is designed to provide a knowledge base to those individuals who have an interest in pursuing a career that involves the wine industry.

Program Requirements

**Code** | **Title** | **Semester Credit Hours**
--- | --- | ---
HORT 416 | Understanding Wine: From Vines to Wines and Beyond | 3

or HORT 420 or Concepts of Wine Production

HORT 419 | Viticulture and Small Fruit Culture | 3

or HORT 31 or Fruit and Nut Production

HORT 421 | Enology | 3

CHEM 222 | Elements of Organic and Biological Chemistry | 3

FSTC 487/ ANSC 487 | Sensory Evaluation of Foods | 3

or ANSC 487 or Sensory Evaluation of Foods

FSTC 487

Total Semester Credit Hours | 15

Applicants must be currently enrolled in an undergraduate degree program at Texas A&M University and, if required, have permission from their departmental advisor to apply for the program.
Any major at Texas A&M University can apply.

An overall Texas A&M University GPA of 2.0 or higher is required for acceptance into the program.

Must complete Certificate in Enology program application.

**Department of Nutrition and Food Science**

Nutritional sciences prepares majors with a comprehensive knowledge of the biological and social sciences to understand the relationships between nutrients, food components and human health. Prevention of diseases that are related to lifestyle, particularly diet and nutrition, is a focus of the curriculum. Core courses emphasize the role of nutrients in biochemistry, genetics, physiology, microbiology and immunology that promotes wellness and enhances the quality of life. The major also provides an excellent background for those interested in pursuing graduate degrees in biological, nutritional or food sciences; professional degrees in human or veterinary medicine; degrees in dentistry, pharmacy, physical therapy, nursing, public health and other health professions; or dietetic internships.

The Didactic Program in Dietetics (DPD) and the Graduate Degree/Dietetic Internship Program are accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND). Students who successfully complete the DPD and a dietetic internship are eligible to take the Registration Examination to become a Registered Dietitian (RD).

Three curriculum tracks are offered (General Nutrition, Didactic Program in Dietetics and Molecular and Experimental Nutrition) to provide flexibility in one’s chosen career path. The Nutrition major prepares one for graduate school, corporate wellness positions, health promotion programs, the food industry, public health programs, pharmaceutical sales, clinical dietetics, medical and research laboratories, biotechnology firms, government agencies and related fields. For more information, visit [http://nfs.tamu.edu](http://nfs.tamu.edu)

**Faculty**

Acuff, Gary R, Professor  
Nutrition & Food Science  
PHD, Texas A&M University, 1985

Allred, Clinton D, Associate Professor  
Nutrition & Food Science  
PHD, University of Illinois at Urbana-Champaign, 2002

Beathard, Karen M, Senior Lecturer  
Nutrition & Food Science  
MS, Texas Woman's University, 1990

Chapkin, Robert S, Professor  
Nutrition & Food Science  
PHD, University of California, Davis, 1986

Chew, Boon P, Professor  
Nutrition & Food Science  
PHD, Purdue University, 1978

Creasy, Rebecca A, Lecturer  
Nutrition & Food Science  
PHD, University of Florida, 2013

Geismar, Karen S, Lecturer  
Nutrition & Food Science  
PHD, Texas Woman's University, 1998

Giles, Erin D, Assistant Professor  
Nutrition & Food Science  
PHD, McMaster University, 2015

Guo, Shaodong, Associate Professor  
Nutrition & Food Science  
PHD, Peking University, China, 1995

Kubena, Karen S, Professor  
Nutrition & Food Science  
PHD, Texas A&M University, 1982

Lorenz, Saundra G, Lecturer  
Nutrition & Food Science  
MS, Texas A&M University, 2002

Murano, Elsa, Professor  
Nutrition & Food Science  
PHD, Virginia Polytechnic Institute and State University, 1990

Murano, Peter S, Senior Associate Professor  
Nutrition & Food Science  
PHD, Virginia Polytechnic Institute and State University, 1989

Patil, Bhimanagouda, Professor  
Nutrition & Food Science  
PHD, Texas A&M University, 1994

Riaz, Mian, AgriLife Professor  
Nutrition & Food Science  
PHD, University of Maine, 1992

Sun, Yuxiang, Assistant Professor  
Nutrition & Food Science  
PHD, University of Manitoba, Canada, 2000

Talcott, Stephen T, Professor  
Nutrition & Food Science  
PHD, University of Arkansas, 2000

Talcott, Susanne U, Associate Professor  
Nutrition & Food Science  
PHD, University of Florida, 2004

Turner, Nancy D, Research Professor  
Nutrition & Food Science  
PHD, Texas A&M University, 1995

Wu, Chaodong, Associate Professor  
Nutrition & Food Science  
PHD, Beijing Medical University, 1998

Xie, Linglin, Assistant Professor  
Nutrition & Food Science  
PHD, Kansas State University, 2008
Majors
- Bachelor of Science in Food Science and Technology, Food Industry Option (p. 172)
- Bachelor of Science in Food Science and Technology, Food Science Option (p. 174)
- Bachelor of Science in Nutrition, Didactic Program in Dietetics Track (p. 176)
- Bachelor of Science in Nutrition, General Nutrition Track (p. 177)
  - Teacher certification in Biology and Life Sciences, Chemistry and Science
- Bachelor of Science in Nutrition, Molecular and Experimental Track (p. 179)

Food Science and Technology - BS, Food Industry Option

Food Science and Technology is an exciting multidisciplinary field that prepares majors with a comprehensive knowledge of the biological, physical and engineering sciences to develop new food products, design innovative processing technologies, improve food quality and nutritive value, enhance the safety of foods and ensure the wholesomeness of our food supply. Food Science majors apply the principles learned in the basic sciences such as food chemistry, biochemistry, genetics, microbiology, food engineering and nutrition to provide consumers with safe, wholesome and attractive food products that contribute to their health and well-being. For more information, visit http://nfs.tamu.edu

The undergraduate curriculum is approved by the Institute of Food Technologists (IFT) and offers two tracks, a Food Science Option and an Industry Option. These tracks provide promising career opportunities in areas such as food product/process design, technical service, research and development, quality assurance, food safety, food law, regulatory oversight, technological innovation, marketing, corporate sales, sensory evaluation and operations management. There are numerous opportunities available for corporate internships, scholarships and study abroad programs that provide real-world experience and enhance opportunities for employment after completing a baccalaureate degree. The major also provides an excellent background for those interested in professional schools, graduate studies, medicine, veterinary medicine, dentistry, pharmacy, physical therapy, nursing, occupational therapy and public health.

Food Industry Option

The Food Industry option integrates knowledge from the basic disciplines of chemistry, microbiology, physics and biology and applies scientific principles from food engineering, food processing operations, sensory evaluation, food safety, HACCP, quality assurance and management to produce foods that are wholesome, affordable and safe. The goal of the curriculum is to prepare Food Technologists for careers in the food and related industries. These careers may involve food processing, manufacturing, technical service, food product development, operations management, regulatory oversight and other technology based opportunities.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
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<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>3</td>
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<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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<td>ENGL 103</td>
<td>Introduction to Rhetoric</td>
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<td>or Composition and Rhetoric</td>
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<td>FSTC 201</td>
<td>Food Science</td>
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<td>Horizons in Nutrition and Food Science</td>
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<td>NUTR 210</td>
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<td>NUTR 202</td>
<td>Fundamentals of Human Nutrition</td>
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<td>or Scientific Principles of Human Nutrition</td>
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<td>CHEM 112</td>
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<td>Principles of Economics</td>
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<td>Language, philosophy and culture elective (p. 23)</td>
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<td>Math elective (p. 22)</td>
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Second Year

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<tr>
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<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>Survey of Accounting Principles</td>
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<td>PHYS 201</td>
<td>College Physics</td>
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<td>Creative arts elective (p. 24)</td>
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Third Year

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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>FSTC 311/</td>
<td>Principles of Food Processing</td>
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<td>ANSC 457</td>
<td>Hazard Analysis and Critical Control Point System</td>
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FSTC 300/ NUTR 300 Religious and Ethnic Foods
FSTC 305 Fundamental Baking
FSTC 307/ ANSC 307 Meats
FSTC 406/ POSC 406 Poultry Further Processing
FSTC 410/ NUTR 410 Nutritional Pharmacometrics of Food Compounds
FSTC 440/ NUTR 440 Therapeutic Microbiology: Probiotics and Related Strategies
FSTC 446/ HORT 446 Commercial Fruit and Vegetable Processing
FSTC 457/ ANSC 457 Hazard Analysis and Critical Control Point System
FSTC 469/ NUTR 469 Experimental Nutrition and Food Science Laboratory
FSTC 471/ NUTR 471 Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews
FSTC 485 Directed Studies
FSTC 489 Special Topics in...
FSTC 491 Research
HORT 419 Viticulture and Small Fruit Culture
HORT 420 Concepts of Wine Production
HORT 421 Enology
HORT 446/ FSTC 446 Commercial Fruit and Vegetable Processing
NUTR 211 Scientific Principles of Foods
POSC 406/ FSTC 406 Poultry Further Processing

Free elective  2  1

| Semester Credit Hours | 15 |

**Spring**

BICH 303 or BICH 410 Elements of Biological Chemistry or Comprehensive Biochemistry I
FSTC 401 Food Product Development
FSTC 481 Seminar
Select one of the following: 3
ANSC 307/ FSTC 307 Meats
FSTC 406/ POSC 406 Poultry Further Processing
FSTC 410/ NUTR 410 Nutritional Pharmacometrics of Food Compounds
FSTC 440/ NUTR 440 Therapeutic Microbiology: Probiotics and Related Strategies
FSTC 446/ HORT 446 Commercial Fruit and Vegetable Processing
FSTC 457/ ANSC 457 Hazard Analysis and Critical Control Point System
FSTC 471/ NUTR 471 Science Literature: Evidence Based Reviews
FSTC 485 Directed Studies
FSTC 489 Special Topics in...
FSTC 491 Research
HORT 419 Viticulture and Small Fruit Culture
HORT 420 Concepts of Wine Production
HORT 421 Enology
HORT 446/ FSTC 446 Commercial Fruit and Vegetable Processing
NUTR 211 Scientific Principles of Foods
POSC 406/ FSTC 406 Poultry Further Processing

Free electives  2  6

| Semester Credit Hours | 16 |

**Fourth Year**

| Semester Credit Hours | 14 |

| Semester Credit Hours | 16 |

| Total Semester Credit Hours | 120 |

1. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences; creative arts; language, philosophy and culture; or electives. For more information visit http://core.tamu.edu
Food Science and Technology - BS, Food Science Option

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Food Science Option

The Food Science option provides a strong knowledge base and fundamental understanding of chemistry, biology, engineering, physics, statistics, genetics, biochemistry, microbiology and nutrition that is applied toward the preservation, processing, packaging and distribution on foods that are wholesome, affordable and safe. The goal of the curriculum is to prepare Food Scientists for career opportunities in the food and allied industries or for further studies in graduate or professional schools. See an academic advisor for specific course listings.

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>ENGL 103  or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
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<tr>
<td>FSTC 201</td>
<td>Food Science</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>CHEM 227</td>
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<tr>
<td>CHEM 237</td>
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<td>ECON 202</td>
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<td>ECON 203</td>
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<td>Language, philosophy and culture elective (p. 23)</td>
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<tbody>
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<tr>
<td>CHEM 316</td>
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<td>CHEM 318</td>
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<td>ENGL 210</td>
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<td>HORT 311/ FSTC 311</td>
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<td>POLS 207</td>
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<td>STAT 302</td>
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<td>Select one of the following:</td>
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</table>

Students may achieve a business minor by taking the following courses as free electives: ISTM 209, MGMT 209, FINC 409, MKTG 409.

A total of 120 hours is required for graduation; 36 hours of 300/400 level courses are required to meet the Texas A&M University residency requirement.

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<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>BIOL 111 Introductory Biology I</td>
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<tr>
<td>CHEM 102 Fundamentals of Chemistry II</td>
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<tr>
<td>CHEM 112 Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td>American history elective (p. 25)</td>
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<tr>
<td>Math elective (p. 22)</td>
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<tr>
<td>Free elective</td>
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<th>Semester Credit Hours</th>
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<tr>
<td>BIO 111</td>
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<tr>
<td>CHEM 102</td>
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<tr>
<td>CHEM 112</td>
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<tr>
<td>American history elective (p. 25)</td>
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<tr>
<td>Math elective (p. 22)</td>
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<table>
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<th>Semester Credit Hours</th>
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</tr>
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<td>NUTR 202</td>
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<td>POLS 206</td>
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<td>ECON 202 Principles of Economics</td>
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<td>ECON 203 Principles of Economics</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
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<tr>
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<td>ACCT 209 Survey of Accounting Principles</td>
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<td>CHEM 228 Organic Chemistry II</td>
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<td>CHEM 238 Organic Chemistry Laboratory</td>
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<td>PHYS 201 College Physics</td>
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<td>Creative arts elective (p. 24)</td>
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<tr>
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<tr>
<td>CHEM 316 Quantitative Analysis</td>
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<td>CHEM 318 Quantitative Analysis Laboratory</td>
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<td>ENGL 210 Technical and Business Writing</td>
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<tr>
<td>HORT 311/ FSTC 311 Principles of Food Processing</td>
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<tr>
<td>POLS 207 State and Local Government</td>
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<tr>
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<td>FSTC 312/ DASC 312 Food Chemistry</td>
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<td>FSTC 313/ DASC 313 Food Chemistry Laboratory</td>
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<td>MGMT 309 Survey of Management</td>
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<td>STAT 302 Statistical Methods</td>
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<td>ANSC 307 Meats</td>
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<td>FSTC 457</td>
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<tr>
<td>FSTC 305</td>
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<td>FSTC 440/</td>
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<td>FSTC 457/</td>
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<td>FSTC 469/</td>
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<td>NUTR 469</td>
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<td>FSTC 471/</td>
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Fourth Year

Fall

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<tbody>
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<td>DASC 314/</td>
<td>Food Analysis</td>
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<td>FSTC 314</td>
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<tr>
<td>DASC 326/</td>
<td>Food Bacteriology</td>
</tr>
<tr>
<td>FSTC 326</td>
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<tr>
<td>DASC 327/</td>
<td>Food Bacteriology Lab</td>
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<td>FSTC 327</td>
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<tr>
<td>FSTC 444</td>
<td>Fundamentals of Food Law</td>
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<td>FSTC 481</td>
<td>Seminar</td>
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Spring

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<th>Course Title</th>
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<tr>
<td>AGSM 315/</td>
<td>Food Process Engineering Technology</td>
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<td>FSTC 315</td>
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<tr>
<td>BICH 303/</td>
<td>Elements of Biological Chemistry</td>
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<td>or BICH 410</td>
<td>Comprehensive Biochemistry I</td>
</tr>
<tr>
<td>FSTC 401</td>
<td>Food Product Development</td>
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</table>

Select one of the following:

- ANSC 307/ Meats
- FSTC 307
- ANSC 457/ Hazard Analysis and Critical Control Point System
- FSTC 457
- FSTC 305/ Fundamental Baking
- FSTC 469/ NUTR 469 Experimental Nutrition and Food Science Laboratory
- FSTC 471/ NUTR 471 Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews
- FSTC 485
- FSTC 489
- FSTC 491
- HORT 419
- HORT 420 Concepts of Wine Production
- HORT 421 Enology
- HORT 446/ FSTC 446 Commercial Fruit and Vegetable Processing
- NUTR 211
- POSC 406/ FSTC 406 Poultry Further Processing

Free elective | 2
| 14          | 120

1 The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences; creative arts; language, philosophy and culture; or electives. For Core Curriculum requirements, http://core.tamu.edu/

2 Students may earn a chemistry minor by taking 6 hours of additional chemistry courses from an approved list as free electives. See the Department of Chemistry for more details. Students seeking a minor in chemistry must complete the Declaration of Minor in Chemistry form and have it approved by the undergraduate advisor in Chemistry (Room 104 Chemistry) and their NFSC advisor.

A total of 120 hours is required for graduation; 36 hours of 300/400 level courses are required to meet the Texas A&M University residency requirement.
Nutrition - BS, Didactic Program in Dietetics Track

Nutritional sciences prepares majors with a comprehensive knowledge of the biological and social sciences to understand the relationships between nutrients, food components and human health. Prevention of diseases that are related to lifestyle, particularly diet and nutrition, is a focus of the curriculum. Core courses emphasize the role of nutrients in biochemistry, genetics, physiology, microbiology and immunology that promotes wellness and enhances the quality of life. The major also provides an excellent background for those interested in pursuing graduate degrees in biological, nutritional or food sciences; professional degrees in human or veterinary medicine; degrees in dentistry, pharmacy, physical therapy, nursing, public health and other health professions; or dietetic internships.

The Didactic Program in Dietetics (DPD) and the Graduate Degree/Dietetic Internship Program are accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND). Students who successfully complete the DPD and a dietetic internship are eligible to take the Registration Examination to become a Registered Dietitian (RD).

Three curriculum tracks are offered (General Nutrition, Didactic Program in Dietetics and Molecular and Experimental Nutrition) to provide flexibility in one’s chosen career path. The Nutrition major prepares one for graduate school, corporate wellness positions, health promotion programs, the food industry, public health programs, pharmaceutical sales, clinical dietetics, medical and research laboratories, biotechnology firms, government agencies and related fields. For more information, visit http://nfs.tamu.edu

Didactic Program in Dietetics Track

The Didactic Program in Dietetics (DPD) is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) and is designed to prepare students for meeting the requirements for the credential of Registered Dietician (RD). The DPD provides a strong science base and foundational courses in nutrition for students desiring a dietetic practice in a clinical, therapeutic, community wellness, public health or food production/service setting.

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
</tr>
<tr>
<td>MATH 141 or MATH 151</td>
<td>Finite Mathematics or Engineering Mathematics I</td>
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<tr>
<td>NUTR 210/ FSTC 210</td>
<td>Horizons in Nutrition and Food Science</td>
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<tr>
<td><strong>Spring</strong></td>
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</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
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<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<td><strong>Semester Credit Hours</strong></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
<tr>
<td>NUTR 203</td>
<td>Scientific Principles of Human Nutrition</td>
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<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology</td>
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<td></td>
<td>American history elective (p. 25)</td>
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<td></td>
<td>Free elective</td>
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<tr>
<td><strong>Spring</strong></td>
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</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>NUTR 211</td>
<td>Scientific Principles of Foods</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<td></td>
<td>Creative arts elective (p. 24)</td>
</tr>
<tr>
<td></td>
<td>Free elective</td>
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<td><strong>Third Year</strong></td>
<td>Semester Credit Hours</td>
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<tr>
<td><strong>Spring</strong></td>
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<tr>
<td>BIOL 319 or VIBS 305</td>
<td>Integrated Human Anatomy and Physiology I or Biomedical Anatomy</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
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<tr>
<td>NUTR 301</td>
<td>Nutrition Through Life</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>Free elective</td>
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<td><strong>Fourth Year</strong></td>
<td>Semester Credit Hours</td>
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<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
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<td>DASC 326/ FSTC 326</td>
<td>Food Bacteriology</td>
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<td>NUTR 404</td>
<td>Nutrition Assessment and Planning</td>
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<td>NUTR 430</td>
<td>Community Nutrition</td>
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<td><strong>Spring</strong></td>
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<tr>
<td>ANTH 205</td>
<td>Peoples and Cultures of the World</td>
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<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
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</table>
Nutritional Treatment of Disease 3
Nutrition and Physiological Chemistry 3
Seminar 1

Semester Credit Hours 13
Total Semester Credit Hours 120

The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences; creative arts; language, philosophy and culture; or electives. For Core Curriculum requirements visit http://core.tamu.edu. Creative Arts Elective (p. 24) and ANTH 205 satisfy both degree requirements as well as international and cultural diversity requirements.

A total of 120 hours is required for graduation; 36 hours of 300/400 level courses are required to meet the Texas A&M University residency requirement.

To be eligible to participate in the DPD program, students must maintain an overall GPR of 2.8 or above and have a grade of at least C in all non-nutrition courses and a grade of at least B in all nutrition courses. See academic advisor for information on specific course listings and eligibility requirements.

Nutrition - BS, General Nutrition Track

Nutritional sciences prepares majors with a comprehensive knowledge of the biological and social sciences to understand the relationships between nutrients, food components and human health. Prevention of diseases that are related to lifestyle, particularly diet and nutrition, is a focus of the curriculum. Core courses emphasize the role of nutrients in biochemistry, genetics, physiology, microbiology and immunology that promotes wellness and enhances the quality of life. The major also provides an excellent background for those interested in pursuing graduate degrees in biological, nutritional or food sciences; professional degrees in human or veterinary medicine; degrees in dentistry, pharmacy, physical therapy, nursing, public health and other health professions; ordietetic internships.

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Three curriculum tracks are offered (General Nutrition, Didactic Program in Dietetics and Molecular and Experimental Nutrition) to provide flexibility in one’s chosen career path. The Nutrition major prepares one for graduate school, corporate wellness positions, health promotion programs, the food industry, public health programs, pharmaceutical sales, clinical dietetics, medical and research laboratories, biotechnology firms, government agencies and related fields. For more information, visit http://nfs.tamu.edu

General Nutrition Track

The General Nutrition Track provides a wide range of approved electives in biochemistry, nutrition, food science, microbiology, immunology, genetics, and psychology in order to customize a degree suited to research interests and career objectives. Through this program, students are prepared to work in community nutrition programs, sports nutrition, education, research, and as technical representatives in the nutrition and health industry. This is also an excellent program for students wanting to go to professional schools such as medicine, dentistry, physical therapy, physician assistant, or pharmacy.

Teacher Certification

The secondary Provisional Teaching Certificate may be obtained in conjunction with the Bachelor of Science degree in Nutritional Sciences, General Nutrition Track. There are three subject areas available for teacher certification through this degree: Biology/Life Science (grades 8-12), Chemistry (grades 8-12), and Science (grades 8-12).

Students must also complete the STEM (Science, Technology, Engineering, Mathematics) minor. Students interested in teacher certification should contact the teacher certification advisor in the Department of Teaching, Learning and Culture in the College of Education and Human Development for more information.

Program Requirements

First Year

Fall
BIOI 111  Introductory Biology I 4
CHEM 101  Fundamentals of Chemistry I 3
CHEM 111  Fundamentals of Chemistry Laboratory I 1
ENGL 103  Introduction to Rhetoric and Composition 3
or ENGL 104  or Composition and Rhetoric
MATH 141  Finite Mathematics 3
or MATH 151  or Engineering Mathematics I
NUTR 210  Horizons in Nutrition and Food Science 2
FSTC 210

Semester Credit Hours 16

Spring
BIOI 112  Introductory Biology II 4
CHEM 102  Fundamentals of Chemistry II 3
CHEM 112  Fundamentals of Chemistry Laboratory II 1
MATH 142  Business Calculus 3
or MATH 152  or Engineering Mathematics II
American history (p. 25) 3
Free elective 1

Semester Credit Hours 15

Second Year

Fall
CHEM 227  Organic Chemistry I 3
CHEM 237  Organic Chemistry Laboratory 1
ENGL 210  Technical and Business Writing 3
NUTR 203  Scientific Principles of Human Nutrition 3
American history (p. 25) 3
Social and behavioral science (p. 25) 3

Semester Credit Hours 16

Spring
CHEM 228  Organic Chemistry II 3
POLS 206  American National Government 3
Creative arts (p. 24)  
Free elective

| Semester Credit Hours | 15 |

### Third Year
#### Fall
- BIOL 319 Integrated Human Anatomy and Physiology  
- NUTR 301 Nutrition Through Life  
- POLS 207 State and Local Government  
- Free elective  
- Technical elective  

| Semester Credit Hours | 14 |

#### Spring
- BIOL 320 Integrated Human Anatomy and Physiology II  
- GENE 301 Comprehensive Genetics  
- GENE 312 Comprehensive Genetics Laboratory  
- STAT 302 Statistical Methods  
- Technical elective  

| Semester Credit Hours | 14 |

### Fourth Year
#### Fall
- BICH 410 Comprehensive Biochemistry I  
- DASC 326/FSTC 326 or BIOL 351 Food Bacteriology or Fundamentals of Microbiology  
- NUTR 430 Community Nutrition  
- Technical elective  
- Free elective  

| Semester Credit Hours | 16 |

#### Spring
- BICH 411 Comprehensive Biochemistry II  
- NUTR 470 Nutrition and Physiological Chemistry  
- NUTR 481 Seminar  
- Language, philosophy and culture (p. 23)  
- Nutrition elective

| Semester Credit Hours | 16 |

1. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences; creative arts; language, philosophy and culture; or electives. For Core Curriculum requirements visit http://core.tamu.edu

2. Students may choose to take two physiology courses, VTPP 423 and VIBS 305, instead of anatomy.

3. Students may choose from the following technical electives: CHEM 238, PHYS 201, PHYS 202, CHEM 315 and CHEM 318, BIOL 413 or BIOL 414, BIOL 352, VTPP 425, COMM 203, COMM 315, or COMM 325, PSYC 306, PSYC 307, BICH 431/GENE 431, HLTH 236, HLTH 334/WSG 334, HLTH 354.

A total of 120 hours is required for graduation; 36 hours of 300/400 level courses are required to meet the Texas A&M University residency requirement.

Students interested in teacher certification must also complete the 18 credit hour STEM (Science, Technology, Engineering, Mathematics) Minor. Substitutions must be approved by the Department of Teaching, Learning and Culture advisors.

Teacher certification in Biology/Life Science
- STEM minor
- Technical electives: one Botany course (BIOL 328); one Ecology course (WFSC 402 or BIOL 357).

Teacher certification in Science
- STEM minor
- Technical electives: PHYS 201 and PHYS 202; one Earth Science course GEOL 101 or GEOL 308 and Ecology course WFSC 420, WFSC 409 or BIOL 357.

Teacher certification in Chemistry
- STEM minor
- No additional courses required

### STEM Minor

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<td>Teaching/Learning Processes: Psychological Perspectives on Education or INST 210 or Understanding Special Populations</td>
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<td>Teaching and Schooling in Modern Society or TEFB 322 or Teaching Skills I</td>
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<td>TEFB 324</td>
<td>Teaching Skills II</td>
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<td>RDNG 372</td>
<td>Reading and Writing across the Middle Grades Curriculum</td>
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NUTR 491 Research

| Semester Credit Hours | 16 |

| Total Semester Credit Hours | 120 |

NUTR 211 Scientific Principles of Foods

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<th>Title</th>
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<td>Religious and Ethnic Foods</td>
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<td>NUTR 405</td>
<td>Nutritional Treatment of Disease</td>
<td>3</td>
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<td>NUTR 410/FSTC 410</td>
<td>Nutritional Pharmacometrics of Food Compounds</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 440/FSTC 440</td>
<td>Therapeutic Microbiology: Probiotics and Related Strategies</td>
<td>3</td>
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<td>NUTR 450</td>
<td>Nutrition and Metabolism of Minerals</td>
<td>3</td>
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<td>NUTR 469/FSTC 469</td>
<td>Experimental Nutrition and Food Science Laboratory</td>
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<td>NUTR 471/FSTC 471</td>
<td>Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews</td>
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<td>NUTR 485</td>
<td>Directed Studies</td>
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<tr>
<td>NUTR 489</td>
<td>Special Topics in...</td>
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Nutrition - BS, Molecular and Experimental Track

Nutritional sciences prepares majors with a comprehensive knowledge of the biological and social sciences to understand the relationships between nutrients, food components and human health. Prevention of diseases that are related to lifestyle, particularly diet and nutrition, is a focus of the curriculum. Core courses emphasize the role of nutrients in biochemistry, genetics, physiology, microbiology and immunology that promotes wellness and enhances the quality of life. The major also provides an excellent background for those interested in pursuing graduate degrees in biological, nutritional or food sciences; professional degrees in human or veterinary medicine; degrees in dentistry, pharmacy, physical therapy, nursing, public health and other health professions; or dietetic internships.

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Three curriculum tracks are offered (General Nutrition, Didactic Program in Dietetics and Molecular and Experimental Nutrition) to provide flexibility in one's chosen career path. The Nutrition major prepares one for graduate school, corporate wellness positions, health promotion programs, the food industry, public health programs, pharmaceutical sales, clinical dietetics, medical and research laboratories, biotechnology firms, government agencies and related fields. For more information, visit http://nfs.tamu.edu

Molecular and Experimental Track

The Molecular and Experimental Track emphasizes a fundamental background in the biological and physical sciences that relate to human health and nutrition. This option offers students the opportunity to develop analytical and critical thinking skills through undergraduate research with department faculty, independent study and study abroad programs, and a science-based curricula that is essential for graduate studies and pre-professional schools. The goal of this track is to enable students to seek employment in specialized science-based fields in the biological or medical sciences, to pursue graduate degrees beyond the baccalaureate or to enter professional schools of medicine, veterinary medicine, dentistry, pharmacy or similar disciplines. See academic advisor for information on application procedures, GPR requirements, specific course listings and eligibility requirements.
HLTH 354  
Medical Terminology for the Health Professions

Third Year
Fall
BIOL 319  
Integrated Human Anatomy and Physiology
or VIBS 305  
I
or Biomedical Anatomy

NUTR 301  
Nutrition Through Life

POLS 207  
State and Local Government

Language, philosophy and culture elective (p. 23)  

Free elective

Semester Credit Hours  16

Spring
BIOL 320  
Integrated Human Anatomy and Physiology
or VTPP 423  
II
or Biomedical Physiology I

CHEM 316  
Quantitative Analysis

CHEM 318  
Quantitative Analysis Laboratory

GENE 301  
Comprehensive Genetics

GENE 312  
Comprehensive Genetics Laboratory

STAT 302  
Statistical Methods

Semester Credit Hours  14

Fourth Year
Fall
BICH 410  
Comprehensive Biochemistry I

NUTR 440/  
Therapeutic Microbiology: Probiotics and Compounds
FSTC 440  
Related Strategies

NUTR 469/  
Experimental Nutrition and Food Science
FSTC 469  
Laboratory

Select one of the following:  

NUTR 405  
Nutritional Treatment of Disease
NUTR 410/  
Nutritional Pharmacometrics of Food
FSTC 410  
Compounds
NUTR 471/  
Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews
FSTC 471  

NUTR 485  
Directed Studies
NUTR 489  
Special Topics in...
NUTR 491  
Research

Free electives

Semester Credit Hours  15

Spring
BICH 411  
Comprehensive Biochemistry II

BICH 431/  
Molecular Genetics
GENE 431  

NUTR 470  
Nutrition and Physiological Chemistry

NUTR 481  
Seminar

Select one of the following:  

NUTR 405  
Nutritional Treatment of Disease
NUTR 410/  
Nutritional Pharmacometrics of Food
FSTC 410  
Compounds

Semester Credit Hours  15

Total Semester Credit Hours  120

1 The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences; creative arts; language, philosophy and culture; or electives. For Core Curriculum requirements visit http://core.tamu.edu

A total of 120 hours is required for graduation; 36 hours of 300/400 level courses are required to meet the Texas A&M University residency requirement.

Department of Plant Pathology and Microbiology

Our mission is to conduct leading edge research on plant diseases and plant-microbe interactions that directly and indirectly impact: Our ability to feed the world; Human and animal health; Environmental stewardship and sustainability. Educate and prepare leaders in the STEM fields of plant and environmental health through a creative and challenging educational environment that integrates scholarship, fundamental knowledge, and experiential learning. Convey information relevant to society through effective outreach and services that address plant health, food safety and environmental health to the citizens of Texas, the United States and the World.

An extension of this mission is to train the next generation of environmental professionals by providing them both the analytical and biological understanding to successfully protect the environment while promoting economic vitality.

Faculty

Dickman, Martin B, Professor
Plant Pathology & Microbiology
PHD, University of Hawaii, 1986

Ebbole, Daniel J, Professor
Plant Pathology & Microbiology
PHD, Purdue University, 1988

Gonzalez, Carlos F, Professor
Plant Pathology & Microbiology
PHD, University of Nebraska, 1978

Gross, Dennis C, Professor
Plant Pathology & Microbiology
PHD, University of California, Davis, 1976

Ireland-Stoddard, Kati L, Instructional Assistant Professor
Plant Pathology & Microbiology
PHD, University of North Texas, 2012
Major breakthroughs are taking place locally, regionally and globally concerning environmental awareness. Environmental hazards take many forms, including microbial threats, toxic wastes and the indirect impact of man's activities on a fragile ecosystem. As a result, there is a growing recognition that the solutions to environmental problems require innovative multi-disciplinary perspectives and technologically-intensive approaches. The Bioenvironmental Sciences curriculum (BESC) was designed in consultation with numerous industry representatives in order to comply with the most current thinking on the talents needed for tomorrow's environmental fields. Students will be prepared for a breadth of career choices in the environmental sciences. These choices include such areas as research and development, environmental consulting, remediation of wastes, site assessment and environmental sampling, and environmental law. Graduates from BESC find employment in federal, state and municipal environmental agencies; in industries concerned with the generation and clean-up of hazardous wastes; with environmental advocacy and educational groups. In addition, the strong science base in BESC prepares students for professional and graduate schools in a variety of disciplines.

The curriculum described combines a foundation of required courses of technical and free electives to allow the student the maximum flexibility to design a personalized course of study. Students are advised to focus on an area of emphasis with those electives that come from such categories as conservation/ecology, policy/ethics/regulations, the physical environment, engineering, plant studies, genetics/biotechnology and general environmental. The Department of Plant Pathology and Microbiology also supports the extracurricular activities needed to support a successful environmental professional.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
<td>3</td>
</tr>
<tr>
<td>BESC 481</td>
<td>Seminar</td>
<td>1</td>
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<tr>
<td>BESC 484</td>
<td>Field Experience</td>
<td>3</td>
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<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>8</td>
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<tr>
<td>&amp; BIOL 107</td>
<td>&amp; Zoology or Introductory Biology I and</td>
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<td>&amp; BIOL 111</td>
<td>&amp; Introductory Biology II</td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I &amp; Fundamentals of Chemistry Laboratory I</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 111</td>
<td>&amp; Fundamentals of Chemistry Laboratory II</td>
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<td>CHEM 102</td>
<td>Fundamentals of Chemistry II &amp; Fundamentals of Chemistry Laboratory II</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 112</td>
<td>&amp; Fundamentals of Chemistry Laboratory II</td>
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<td>CHEM 222</td>
<td>Elements of Organic and Biological Chemistry</td>
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<tr>
<td>&amp; CHEM 242</td>
<td>&amp; Elementary Organic Chemistry Laboratory</td>
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<tr>
<td>or CHEM 227</td>
<td>&amp; Organic Chemistry I or Choice</td>
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<tr>
<td>&amp; CHEM 233</td>
<td>or Organic Chemistry Laboratory</td>
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<tr>
<td>GENE 310</td>
<td>Principles of Heredity</td>
<td>3</td>
</tr>
<tr>
<td>or GENE 311</td>
<td>or Genetics of Plants</td>
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</tr>
<tr>
<td>PLPA 301</td>
<td>Plant Pathology &amp; Plant Pathology Laboratory</td>
<td>4</td>
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<tr>
<td>&amp; PLPA 303</td>
<td>&amp; Plant Pathology Laboratory</td>
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<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology &amp; Fundamentals of Ecology Laboratory</td>
<td>4</td>
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<tr>
<td>&amp; RENR 215</td>
<td>&amp; Fundamentals of Ecology Laboratory</td>
<td></td>
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<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
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<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
<td>3</td>
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<tr>
<td>American history elective (p. 25)</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Bioenvironmental Sciences group electives 18
Select from the following:
Environmental Studies - BS

The BS degree in Environmental Studies in the College of Agriculture and Life Sciences provides students with the opportunity to learn about the major societal forces that influence environmental issues. These include political agreement supporting legal and regulatory requirements, economics and the marketplace, environmental values, and technology. Students gain technical background blended with a solid foundation in economics, political issues, environmental law, ethics, and communications. Technology and the environment are well supported in existing curricula and contribute to the multidisciplinary nature of the Environmental Studies degree. Technical courses focus on biological sciences, natural resources, and assessment of the environment and come from the Agricultural Economics; Bioenvironmental Sciences; Entomology; Forest Science; Rangeland Ecology and Management; Recreation, Park and Tourism Sciences; Soil and Crop Sciences; and Wildlife and Fisheries Sciences. It is the fusion of these courses with those from the Liberal Arts that make this a truly unique curriculum. This degree is housed within the Department of Plant Pathology and Microbiology.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td><strong>Required Courses</strong></td>
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<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
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</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
<td>3</td>
</tr>
<tr>
<td>BESC 481</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>BESC 484</td>
<td>Field Experience</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 111</td>
<td>or Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 309</td>
<td>Environmental Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>&amp; Fundamentals of Chemistry Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>ESSM 309</td>
<td>Forest Ecology</td>
<td>3</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>Select one of the following:</td>
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<tr>
<td>ESSM 351</td>
<td>Geographic Information Systems</td>
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<tr>
<td>RENR 405</td>
<td>for Resource Management</td>
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<tr>
<td>RENR 405/</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 351</td>
<td>for Resource Management</td>
<td>3</td>
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<tr>
<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
<td>3</td>
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<tr>
<td>GEOG 213</td>
<td>Planet Earth Lab</td>
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<td>GEOG 304</td>
<td>Economic Geography</td>
<td>3</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>RENR 375</td>
<td>Conservation of Natural Resources</td>
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</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
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<tr>
<td>STAT 303</td>
<td>Statistical Methods</td>
<td>3</td>
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<tr>
<td>WFSC 301</td>
<td>Wildlife and the Changing Environment</td>
<td>3</td>
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<tr>
<td>American history elective (p. 25)</td>
<td>6</td>
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</tr>
<tr>
<td>Communication elective (p. 22)</td>
<td>3</td>
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<tr>
<td>Creative arts elective (p. 24)</td>
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<tr>
<td>Environmental policy elective</td>
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<tr>
<td>Select five of the following in consultation with academic advisor:</td>
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<tr>
<td>AGE 394</td>
<td>Food and Agricultural Law</td>
<td>3</td>
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<td>AGE 390</td>
<td>Environmental and Natural Resource Economics</td>
<td>3</td>
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<td>AGEC 492</td>
<td>Agricultural Policy</td>
<td>3</td>
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<tr>
<td>AGSM 355</td>
<td>Energy and Conversion Systems</td>
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</tr>
<tr>
<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
<td>3</td>
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<tr>
<td>BESC 357</td>
<td>Biotechnology for Biofuels and Bioproducts</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 323</td>
<td>Microeconomic Theory</td>
<td>3</td>
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</tbody>
</table>
Select four of the following in consultation with academic advisor:

**AGSM 301** Systems Analysis in Agriculture  
**AGSM 337** Technology for Environmental and Natural Resource Engineering  
**BESC 204** Molds and Mushrooms: The Impact of Fungi on Society and the Environment  
**BESC 320** Water and the Bioenvironmental Sciences  
**BESC 401** Bioenvironmental Microbiology  
**BESC 403** Sampling and Environmental Monitoring  
**ENTO 201** General Entomology  
**ENTO 313** Biology of Insects  
**ENTO 320** Honey Bee Biology  
**ENTO 403** Urban Entomology  
**ENTO 424** Insect Ecology  
**FRSC 421** Urban Forestry  
**HORT 301** Garden Science  
**POSC 427** Animal Waste Management  
**RENR 410** Ecosystem Management

**RPTS 316** Recreational Management of Wildlands  
**RPTS 426** Tourism Impacts  
**RPTS 460** Nature, Values, and Protected Areas  
**RENR 460**  
**WFSC 304** Wildlife and Fisheries Conservation  
**WFSC 403** Animal Ecology  
**WFSC 405** Urban Wildlife and Fisheries  
**WFSC 418** Ecology of the Coastal Zone  
**WFSC 420** Ecology and Society

Social and behavioral science elective (p. 25)  
Free electives

Total Semester Credit Hours

1 The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.

A minimum of 120 semester hours will be required for a BS degree.

**University Studies - BS, Environmental Business Concentration**

A University Studies Degree differs from a traditional “major” in that it consists of a concentration of 21-24 hours and two minors of 15-18 hours each. The University Studies Degree format was created to provide students the flexibility to combine areas of study that are of special interest. Under the guidelines of the University Studies degree requirements, the student’s diploma will list “University Studies” in the place where the major is currently listed. The student’s area of concentration (Environmental Business) and the two minors (Rangeland Ecology & Management AND Business) will be indicated on the student’s transcript.

This new degree option features a blending of environmental science coursework and business coursework in a truly unique combination unlike any other degree at Texas A&M University. The Environmental Business concentration draws heavily from the established Bioenvironmental Sciences degree already offered at Texas A&M, but this concentration is significantly different in that it lacks the larger number of life science courses that serve as a necessary foundation in any environmental science degree. The focus on environmental coursework (through the BESC and ESSM courses) coupled with core business coursework allows this University Studies concentration to provide a very well-rounded and marketable degree in a variety of arenas.

This interdisciplinary degree plan provides a highly-marketable focus from an already fast-rising, multi-faceted discipline. The coursework retains the “customizable” nature of the university studies degree within the concentration itself, allowing students a truly one-of-a-kind opportunity for their bachelor’s degree. The Environmental Business concentration provides a solid foundation of Bioenvironmental Sciences coursework that, when paired with the Rangeland Ecology & Management minor and the Business minor, provides students with a versatile, sound degree that is uniquely positioned in the job market and combines a
general overview of both environmental issues/policies and business administration principals/content.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESC 201</td>
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<td>3</td>
</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
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<td>BESC 481</td>
<td>Seminar</td>
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<td>BESC 484</td>
<td>Field Experience</td>
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</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>or BIOL 111 or Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>Fundamentals of Chemistry--Laboratory</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<td>&amp; RENR 215</td>
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<td>BESC concentration electives</td>
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<tr>
<td>BESC 204</td>
<td>Molds and Mushrooms: The Impact of Fungi on Society and the Environment</td>
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<tr>
<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
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<td>BESC 320</td>
<td>Water and the Bioenvironment Sciences</td>
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<td>BESC 357</td>
<td>Biotechnology for Biofuels and Bioproducts</td>
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<tr>
<td>BESC 489</td>
<td>Special Topics in...</td>
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<tr>
<td>PLPA 301</td>
<td>Plant Pathology &amp; PLPA 303 and Plant Pathology Laboratory</td>
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<tr>
<td>Communication (p. 22)</td>
<td></td>
<td>3</td>
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<td>Creative arts (p. 24)</td>
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<td>Language, philosophy and culture (p. 23)</td>
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<tr>
<td>Mathematics (p. 22)</td>
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<tr>
<td>Social and behavioral science (p. 25)</td>
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<td>3</td>
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<tr>
<td>American history (p. 25)</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>State and Local Government</td>
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<td>Business Minor</td>
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<tr>
<td>Rangeland Ecology and Management Minor</td>
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<td>Total Semester Credit Hours</td>
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</tbody>
</table>

1. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.

**Business Minor**

The minor in business consists of six specific courses chosen to develop a foundational knowledge in the basic aspects of business, including accounting, finance, management, marketing, and management information systems.

The courses listed below constitute the 18 hours required for a minor in business.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles (or TCCNS ACCT 2301 or 2401)</td>
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<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
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</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society (or Blinn College BUSI 2371)</td>
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<tr>
<td>FINC 409</td>
<td>Survey of Finance Principles ^1</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Survey of Management ^1</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 409</td>
<td>Principles of Marketing ^1</td>
<td>3</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

1. Course must be taken in residence at Texas A&M. No transfer courses or substitutions will be allowed.
2. Credit by exam is offered for students who have not taken ISTM 209 but can demonstrate mastery of the concepts. See dars.tamu.edu/testing.
3. MGMT 212 cannot be used to meet this requirement.

Students must earn a grade of "C" or better in each course listed above to be awarded the business minor and receive transcript recognition.

**Rangeland Ecology and Management Minor**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ESSM 302</td>
<td>Wildlands Plants of North America</td>
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<tr>
<td>ESSM 303</td>
<td>Agrostology</td>
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<tr>
<td>ESSM 304</td>
<td>Rangeland Plant Taxonomy</td>
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<tr>
<td>ESSM 314</td>
<td>Principles of Rangeland Management Around the World</td>
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<tr>
<td>Select three of the following:</td>
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<tr>
<td>ESSM 301</td>
<td>Wildlands Watershed Management</td>
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<tr>
<td>ESSM 316</td>
<td>Range Ecology</td>
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<tr>
<td>ESSM 317</td>
<td>Vegetation Management</td>
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</tr>
<tr>
<td>ESSM 320</td>
<td>Ecosystem Restoration and Management</td>
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</tr>
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<td>ESSM 416</td>
<td>Fire Ecology and Natural Resource Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 420</td>
<td>Ecological Restoration of Wetland and Riparian Systems</td>
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<tr>
<td>Total Semester Credit Hours</td>
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<td>15</td>
</tr>
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</table>

Students must make a grade of "C" or better in all courses.

**Bioenvironmental Sciences - Minor**

The minor in Bioenvironmental Sciences is available to all students enrolled at Texas A&M University.
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
<td>3</td>
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<tr>
<td>PLPA 301</td>
<td>Plant Pathology</td>
<td>3</td>
</tr>
<tr>
<td>PLPA 303</td>
<td>Plant Pathology Laboratory</td>
<td>1</td>
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<tr>
<td></td>
<td>Select 9 hours from the following:</td>
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<tr>
<td>BESC 204</td>
<td>Molds and Mushrooms: The Impact of Fungi on Society and the Environment</td>
<td></td>
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<tr>
<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
<td></td>
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<tr>
<td>BESC 320</td>
<td>Water and the Bioenvironmental Sciences</td>
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</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
<td></td>
</tr>
<tr>
<td>BESC 401</td>
<td>Bioenvironmental Microbiology</td>
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</tr>
<tr>
<td>BESC 402</td>
<td>Microbial Processes in Bioremediation</td>
<td></td>
</tr>
<tr>
<td>BESC 403</td>
<td>Sampling and Environmental Monitoring</td>
<td></td>
</tr>
<tr>
<td>BESC 484</td>
<td>Field Experience</td>
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<tr>
<td>BESC 485</td>
<td>Directed Studies</td>
<td></td>
</tr>
<tr>
<td>BESC 489</td>
<td>Special Topics in...</td>
<td></td>
</tr>
<tr>
<td>BESC 491</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>16</td>
</tr>
</tbody>
</table>

Students must make a grade of "C" or better in all courses.

Department of Poultry Science

Growth of the poultry industry has created the need for scientific, technical and business knowledge in the various fields important to successful poultry production. In few fields of science is an understanding of the basic sciences, nutrition, genetics, physiology, diseases, biotechnology, processing and marketing more rewarding than in the modern, intensive methods of poultry and food production. Students are trained in the necessary background, analytical skills, problem solving and leadership for complex production units, hatcheries, integrated feed mills, processing plants and research laboratories. Rapid industry growth provides many career opportunities for graduates. Students are given two emphasis areas in which to specialize their education toward their selected career goals. The University Core Curriculum courses and the Poultry Science Core courses are required for both emphases. Students then complete a BS degree in either emphasis area by completing the respective emphasis area courses. All students are strongly encouraged to get early and frequent academic counseling which is readily available.

Faculty

Alvarado, Christine Z, Professor
Poultry Science
PHD, Texas A&M University, 2001

Athrey, Girdhar N, Assistant Professor
Poultry Science
PHD, University of Louisiana at Lafayette, 2009

Bailey, Christopher A, Professor
Poultry Science
PHD, Texas A&M University, 1982

Berghman, Luc R, Associate Professor
Poultry Science
PHD, University of Leuven, Belgium, 1987

Caldwell, David J, Professor
Poultry Science
PHD, Texas A&M University, 1997

Carey, John B, Professor
Poultry Science
PHD, Kansas State University, 1982

Duong, Tri, Associate Professor
Poultry Science
PHD, North Carolina State University, 2008

Farnell, Morgan B, Associate Professor
Poultry Science
PHD, Texas A&M University, 2003

Farnell, Yuhua Z, Instructional Assistant Professor
Poultry Science
PHD, Texas A&M University, 2002

Lee, Jason T, Associate Professor
Poultry Science
PHD, Texas A&M University, 2006

Pillai, Suresh D, Professor
Poultry Science
PHD, University of Arizona, 1989

Sams, Alan R, Professor
Poultry Science
PHD, University of Florida, 1987

Walzem, Rosemary L, Professor
Poultry Science
PHD, University of California, Davis, 1987

Majors

- Bachelor of Science in Poultry Science, Industry Emphasis (p. 185)
- Bachelor of Science in Poultry Science, Technical Emphasis (p. 186)

Minors

- Poultry Science Minor (p. 187)

Poultry Science - BS, Industry Emphasis

Growth of the poultry industry has created the need for scientific, technical and business knowledge in the various fields important to successful poultry production. In few fields of science is an understanding of the basic sciences, nutrition, genetics, physiology, diseases, biotechnology, processing and marketing more rewarding than in the modern, intensive methods of poultry and food production. Students are trained in the necessary background, analytical skills,
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSC 302</td>
<td>Avian Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>POSC 308</td>
<td>Avian Anatomy and Physiology</td>
<td>3</td>
</tr>
<tr>
<td>POSC 309</td>
<td>Poultry Meat Production</td>
<td>4</td>
</tr>
<tr>
<td>POSC 319</td>
<td>Breeder and Hatchery Management</td>
<td>3</td>
</tr>
<tr>
<td>POSC 326</td>
<td>Commercial Egg Industry</td>
<td>3</td>
</tr>
<tr>
<td>POSC 381</td>
<td>Investigation of Professional Development in Poultry Science</td>
<td>2</td>
</tr>
<tr>
<td>POSC 405/ FSTC 405</td>
<td>Egg and Poultry Meat Processing</td>
<td>3</td>
</tr>
<tr>
<td>POSC 406/ FSTC 406</td>
<td>Poultry Further Processing</td>
<td>4</td>
</tr>
<tr>
<td>POSC 411</td>
<td>Poultry Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>POSC 412</td>
<td>Poultry Feed Formulation</td>
<td>3</td>
</tr>
<tr>
<td>POSC 414</td>
<td>Avian Genetics and Breeding</td>
<td>3</td>
</tr>
<tr>
<td>POSC 427</td>
<td>Animal Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>POSC 429</td>
<td>Advanced Food Bacteriology</td>
<td>4</td>
</tr>
<tr>
<td>POSC 481</td>
<td>Poultry Science Systems</td>
<td>2</td>
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</tbody>
</table>

Support Courses

- ACCT 209  Survey of Accounting Principles  3
- CHEM 222  Elements of Organic and Biological Chemistry  3
- DASC 326/ FSTC 326  Food Bacteriology  3
- STAT 301  Introduction to Biometry  3
- or ACCT 314  Marketing Agricultural and Food Products  3
- or STAT 302  or Statistical Methods  3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
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<tr>
<td>AGEC 340</td>
<td>Agribusiness Management</td>
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<tr>
<td>AGEC 344</td>
<td>Food and Agricultural Law</td>
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</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
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<tr>
<td>or ECON 208</td>
<td>Principles of Economics</td>
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<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
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<tr>
<td>MGMT 212</td>
<td>Business Law</td>
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<tr>
<td>MGMT 105</td>
<td>Introduction to Business</td>
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<tr>
<td>Electives 1</td>
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</table>

University Core Curriculum

- AGEC 105  Introduction to Agricultural Economics  3
- BIOL 111  Introductory Biology I  4
- or BIOL 107  Zoology  4
- CHEM 101  Fundamentals of Chemistry I  4
- & CHEM 111  and Fundamentals of Chemistry Laboratory I  4
- POSC 201  General Avian Science  3

Select one of the following:

- ACCT 210  Survey of Managerial and Cost Accounting Principles  3
- MGMT 105  Business Law  3

1 To be utilized by students to enhance the science and/or business aspects of their undergraduate program.
2 Six hours must be selected from the International Cultural Diversity section of the Graduation requirements.

Poultry Science - BS, Technical Emphasis

Growth of the poultry industry has created the need for scientific, technical and business knowledge in the various fields important to successful poultry production. In few fields of science is an understanding of the basic sciences, nutrition, genetics, physiology, diseases, biotechnology, processing and marketing more rewarding than in the modern, intensive methods of poultry and food production. Students are trained in the necessary background, analytical skills, problem solving and leadership for complex production units, hatcheries, integrated feed mills, processing plants and research laboratories. Rapid industry growth provides many career opportunities for graduates. Students are given two emphasis areas in which to specialize their education toward their selected career goals. The University Core Curriculum courses and the Poultry Science Core courses are required for both emphasis. Students then complete a BS degree in either emphasis area by completing the respective emphasis area courses. All students
are strongly encouraged to get early and frequent academic counseling which is readily available.

Students completing a BS degree in the industry emphasis find employment with the poultry and food industries in positions such as corporate management, quality assurance, sales or technical support in live production, processing or marketing. Students in this emphasis also get positions with pharmaceutical and equipment companies, with industry trade publications and in various university and public service positions.

Students completing a BS degree in the technical emphasis are prepared for advanced study in biochemistry, nutrition, physiology, molecular genetics, reproduction, processing technology, microbiology or environmental science and for eventual professional employment in research, teaching or public service. This curriculum can be easily tailored to meet the veterinary medicine preprofessional requirements.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSC 302</td>
<td>Avian Science Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>POSC 308</td>
<td>Avian Anatomy and Physiology</td>
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</tr>
<tr>
<td>POSC 309</td>
<td>Poultry Meat Production</td>
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<td>Breeder and Hatchery Management</td>
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<td>POSC 326</td>
<td>Commercial Egg Industry</td>
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<td>Investigation of Professional Development in Poultry Science</td>
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<td>POSC 406/ FSTC 406</td>
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<td>POSC 411</td>
<td>Poultry Nutrition</td>
<td>3</td>
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<tr>
<td>POSC 412</td>
<td>Poultry Feed Formulation</td>
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<td>POSC 427</td>
<td>Animal Waste Management</td>
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<td>Advanced Food Bacteriology</td>
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<tr>
<td>POSC 481</td>
<td>Poultry Science Systems</td>
<td>2</td>
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</table>

**Support Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BICH 303</td>
<td>Elements of Biological Chemistry</td>
<td>3</td>
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<tr>
<td>BIOL 351</td>
<td>Fundamentals of Microbiology or VTPB 405 or Biomedical Microbiology</td>
<td>4</td>
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<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<tr>
<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 237</td>
<td>and Organic Chemistry Laboratory</td>
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<tr>
<td>GENE 301</td>
<td>Comprehensive Genetics</td>
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<tr>
<td>&amp; GENE 312</td>
<td>and Comprehensive Genetics Laboratory</td>
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<tr>
<td>STAT 301</td>
<td>Introduction to Biometry or STAT 302 or Statistical Methods</td>
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<td>VTPB 334</td>
<td>Poultry Diseases</td>
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<td>Electives</td>
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**University Core Curriculum**

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I or BIOL 107 or Zoology</td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>POSC 201</td>
<td>General Avian Science</td>
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<tr>
<td>American history elective (p. 25)</td>
<td>6</td>
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<tr>
<td>Communication elective (p. 22)</td>
<td>6</td>
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<tr>
<td>Creative arts elective (p. 24)</td>
<td>3</td>
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<tr>
<td>Government/Political science elective (p. 25)</td>
<td>6</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>3</td>
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<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
<td>3</td>
</tr>
</tbody>
</table>

**Department of Recreation, Park and Tourism Sciences**

The undergraduate curriculum leading to a Bachelor of Science degree with a major in Recreation, Park and Tourism Sciences emphasizes problem-solving skills, development of an international perspective and...
the application of scientific principles to managerial problems. Students study both the social and life sciences to gain an understanding of how to manage and market organizations in the vast park, recreation and tourism industry. The curriculum provides the student with an introduction to the history and concepts of recreation, park and tourism sciences, followed by the knowledge and skills for both entry-level positions and for future professional growth in the field. In addition to core courses, students must fulfill requirements for at least one certificate, and may earn additional certificates. An education in recreation, park and tourism sciences prepares students to become leaders for the 21st century with the capacity to learn from life and throughout life.

Faculty

Crompton, John L, Distinguished Professor
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 1977
MBA, Loughborough University, England, 1970

Durko, Angela M, Lecturer
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 2014

Ellis, Gary D, Professor
Recreation, Parks, And Tourism Sc
PHD, North Texas State University, 1983

Gramann, James H, Professor
Recreation, Parks, And Tourism Sc
PHD, University of Illinois at Urbana-Champaign, 1980

Harwell, William R, Assistant Professor of the Practice
Recreation, Parks, And Tourism Sc
MS, Memphis State University, 1980

Heo, Jin Moo, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, Indiana University, 2007

Hodges, Louis, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 1971

Jacob, John, Professor & Extension Specialist
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 1992

Jamal, Tazim B, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, University of Calgary, 1997
MBA, The University of British Columbia, Vancouver, BC, 1991

Kaiser, Ronald A, Professor
Recreation, Parks, And Tourism Sc
LLM, University of California, Berkeley, 1989
JD, Thomas M. Cooley Law School, 1977

Kyle, Gerard T, Professor
Recreation, Parks, And Tourism Sc
PHD, The Pennsylvania State University, 2001

Kyle, Kelly T, Lecturer
Recreation, Parks, And Tourism Sc
MS, The Pennsylvania State University, 2000

Martz, Jill T, Executive Professor
Recreation, Parks, And Tourism Sc
PHD, University of Tennessee, 2004

Matarrita Cascante, David, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, The Pennsylvania State University, 2008

Outley, Corliss D, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 2000

Petrick, James F, Professor
Recreation, Parks, And Tourism Sc
PHD, Clemson University, 1999

Ramer, Svitlana I, Lecturer
Recreation, Parks, And Tourism Sc
PHD, The Pennsylvania State University, 2014

Richmond, Daniel J, Lecturer
Recreation, Parks, And Tourism Sc
PHD, University of Utah, 2016
MBA, University of Oregon, 2012

Schuett, Michael, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, University of Illinois at Urbana-Champaign, 1991

Scott, David, Professor
Recreation, Parks, And Tourism Sc
PHD, The Pennsylvania State University, 1990

Scott, Susan G, Lecturer
Recreation, Parks, And Tourism Sc
MS, The Pennsylvania State University, 1987

Shafer, C S, Professor
Recreation, Parks, And Tourism Sc
PHD, Clemson University, 1993

Shafer, Debra M, Lecturer
Recreation, Parks, And Tourism Sc
MS, University of Utah, 1985

Stronza, Amanda L, Associate Professor
Recreation, Parks, And Tourism Sc
PHD, University of Florida, 2000

Thomas, John, Professor Emeritus
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 1979

Walker, Jamie Rae, Associate Professor & Extension Specialist
Recreation, Parks, And Tourism Sc
PHD, Texas A&M University, 2008
Majors
- Bachelor of Science in Recreation, Park and Tourism Sciences with Certificate (p. 189)
- Bachelor of Science in Renewable Natural Resources (p. 156)

Minors
- Park and Natural Resource Management Minor (p. 192)
- Recreation, Park and Tourism Sciences Minor (p. 193)
- Tourism Management Minor (p. 193)
- Youth Development Minor (p. 193)

Certificates
- Community Recreation and Park Administration Certificate (p. 194)
- Hospitality Management Certificate (p. 194)
- Parks and Conservation Certificate (p. 194)
- Professional Event Manager Certificate (p. 195)
- Tourism Management Certificate (p. 195)
- Youth Development Certificate (p. 195)

Recreation, Park and Tourism Sciences - BS with Certificate
The undergraduate curriculum leading to a Bachelor of Science degree with a major in Recreation, Park and Tourism Sciences provides students with an education in recreation, park and tourism sciences, with an emphasis on problem-solving skills, development of an international perspective and the application of scientific principles to managerial problems. The first two years of studies build a foundation that spans a wide range of disciplines and bodies of knowledge in the arts and sciences and provide the student with an introduction to the history and concepts of recreation, park and tourism sciences. The second two years prepare students with the knowledge and skills for both entry-level positions and for future professional growth in the field. In addition to core courses, students must fulfill requirements for at least one certificate, but may earn additional certificates.

Through the curriculum, students develop the depth and breadth of knowledge needed to scientifically investigate and select among alternatives as well as the intellectual skills to organize and integrate their knowledge in new and more effective patterns. An education in recreation, park and tourism sciences prepares students to become professionals with the capacity to learn from life and throughout life.

The department maintains links with other resource-management programs within the University as well as exchange programs with other academic entities. Supporting programs at Texas A&M include the resource management programs in Ecosystem Science and Management, Wildlife and Fisheries Sciences, and the Sports Management Specialization in the Department of Health and Kinesiology.

Recreation, Park and Tourism Sciences majors must complete at least one certificate.

Certificate Options
Community Recreation and Park Administration Certificate
Management of recreation, park and leisure-service agencies requires expertise in problem-solving, decision-making, assessment of social and environmental impacts, personnel, public relations, volunteer management, financing and fund-raising, marketing of services, and needs assessments. Skills in working with people in the legal and political environment are necessary, as well as the ability to assess and work with other organizations for cooperative developments in recreation and tourism. Utilizing computer based decision-aids, students in this emphasis prepare for managerial careers with public recreation and park agencies, youth agencies, not-for-profit recreation agencies, and commercial recreation enterprises.

Parks and Conservation Certificate
This option focuses on management of natural and cultural resources associated with conserving parks, and other protected areas, while also providing for their use by people. Land managers and related professionals operate within a variety of forums that require the integration of concepts in the environmental, social and behavioral sciences, along with policy and administrative decision-making. Necessary skills include computer applications for natural resource management, planning and design related to natural and cultural resources. Students with an option in this field look forward to careers with both public and private employers in the recreation, park and tourism fields, including state and federal agencies and private enterprises, non-profit organizations, camps and environmental education programs.

Tourism Management Certificate
Tourism is one of the world's largest and most diverse industries. To help students prepare for tourism careers, this option area introduces issues pertaining to the management, development, and promotion of places and events as tourism attractions. Courses in tourism are designed to collectively build understanding about the links that exist between local places, host populations, and various public, private and special interest groups. Students also develop competencies in assessing economic, environmental, social and political impacts of tourism, as well as in tourism marketing. Students in this option can pursue careers in private sector enterprises, government agencies, convention and visitor bureaus, and other tourism-related service organizations.

Youth Development Certificate
This option focuses on programs and services that contribute to the development of young people's personal, physical, social and educational abilities. Youth workers are program developers, leaders and managers who need to be able to work with youth, families, organizations and communities. Coursework in this option focuses on positive youth development, program planning and evaluation, methods for working with young people, and societal factors that both contribute to and inhibit the development of young people. Students with an option in this field look forward to careers with non-profit, public and for-profit agencies that supply youth development opportunities for young people. Settings include after-school programs, community programs, camps, outdoor adventure and church-related recreation programs.
### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recreation, Park and Tourism Sciences</td>
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</tr>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 404</td>
<td>Communicating Agricultural Information to the Public</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 201</td>
<td>Foundations of Recreation, Parks and Tourism</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 230</td>
<td>Computer Applications in Recreation, Parks and Tourism</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 302</td>
<td>Application of Tourism Principles</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 311</td>
<td>Planning and Implementation of Events and Programs</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 336</td>
<td>Research and Analysis in Recreation and Tourism</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 340</td>
<td>Recreation, Parks, Tourism and Diverse Populations</td>
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</tr>
<tr>
<td>RPTS 481</td>
<td>Seminar</td>
<td>1</td>
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<tr>
<td>RPTS 484</td>
<td>Internship</td>
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<tr>
<td>STAT 201</td>
<td>Elementary Statistical Inference</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 301</td>
<td>or Statistical Methods</td>
<td></td>
</tr>
<tr>
<td>or STAT 302</td>
<td>or Statistical Methods</td>
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</table>

#### University Core Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
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</tr>
<tr>
<td></td>
<td>MATH 142</td>
<td>Business Calculus</td>
</tr>
<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
<td></td>
</tr>
<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
<td>1</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>RENR 215</td>
<td>Fundamentals of Ecology--Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Life and Physical Sciences elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 101</td>
<td>Botany</td>
</tr>
<tr>
<td>BIOL 107</td>
<td>Zoology</td>
<td></td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
<td></td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 11</td>
<td>Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>CHEM 103</td>
<td>Structure and Bonding</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 11</td>
<td>Physical and Chemical Principles</td>
<td></td>
</tr>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 11</td>
<td>General Chemistry for Engineering Students Laboratory</td>
<td></td>
</tr>
<tr>
<td>GEOL 101</td>
<td>Principles of Geology</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
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</table>

#### Certificate Options

##### Community Recreation and Park Administration Certificate

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 209</td>
<td>Park and Tourism Operations</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td>3</td>
</tr>
<tr>
<td>or RPTS 423</td>
<td>or Tourism Management</td>
<td></td>
</tr>
<tr>
<td>RPTS 370</td>
<td>Youth Development Organizations and Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 402</td>
<td>Park Planning and Design</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 403</td>
<td>Financing and Marketing Recreation, Park and Tourism Resources</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Departmental electives (p. 950)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Free electives</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>44</td>
</tr>
</tbody>
</table>

##### Parks and Conservation Certificate

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RENR 460/ RPTS 460</td>
<td>Nature, Values, and Protected Areas</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 307</td>
<td>Methods of Environmental Interpretation</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 316</td>
<td>Recreational Management of Wildlands</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 402</td>
<td>Park Planning and Design</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 403</td>
<td>Financing and Marketing Recreation, Park and Tourism Resources</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Free electives</td>
<td>25</td>
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<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>44</td>
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</table>

##### Tourism Management Certificate

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 320</td>
<td>Event Management and Operations</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 331</td>
<td>Tourism Marketing</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 401</td>
<td>Tourism and Recreation Enterprises</td>
<td>3</td>
</tr>
</tbody>
</table>
Renewable Natural Resources - BS

Professional Fields of Study and Department Heads

Ecosystem Science and Management, Kathleen Kavanagh, Head
Recreation, Park and Tourism Sciences, Gary D. Ellis, Head
Wildlife and Fisheries Sciences, John B. Carey, Interim Head

General Statement

Three departments offer degrees in specific areas of natural resources management and conservation. Students may select one of these degree programs or a broad approach to natural resource education by pursuing the multi-department degree in Renewable Natural Resources.

Renewable Natural Resources

Renewable Natural Resources (RENR) is for students desiring a rigorous education in the study and management of sustainable ecosystems for a wide variety of resource values. The RENR program of study is comprised of a core of courses and two emphases. The goal of this core/emphasis structure is to provide students with an identity as a renewable natural resources specialist, while, at the same time, affording the flexibility for preparation for a variety of career tracks. One emphasis focuses on management and the other on policy. Technical electives prepare the students in chosen educational and career directions. The underlying goal of the RENR degree is to integrate the scientific issues of renewable natural resources. Graduates of this program will be able to articulate these issues verbally and in writing in their chosen career. Therefore, the RENR degree emphasizes verbal presentations and major papers as well as field-oriented activities.

The RENR programs are designed to help students prepare for careers in public and private organizations associated with the planning and use of natural resources and the environment. Possible employment includes areas such as multi-use land management, environmental assessment, resource inventory, natural resource planning, law, policy analysis and land remediation.

An emphasis may be selected in policy or management. The RENR degree consists of 120 credit hours: 42 university core, 42-45 common to both emphasis areas and 24-27 designated by the emphasis area and 9 free elective hours.

RENR Areas of Emphasis

The BS in Renewable Natural Resources includes two emphasis areas for students to select. The directed electives available from advisors are what differentiates the emphases.

Management Emphasis

Designed for an education in the scientific management of integrated natural resources. In today’s world, it is important to have college graduates prepared to deal with integrated systems, accounting for all of the separate aspects of the system. The management emphasis seeks to prepare the student to integrate concerns related to land, water, air, plants and wildlife into the management process. Students select 24 credit hours of directed electives from an approved list in consultation with their advisor. The remaining 9 credit hours are free electives.

Policy Emphasis

Designed for students desiring an education in natural resources policy. This emphasis incorporates knowledge from all renewable natural resources disciplines, which provides a foundation for decision-making related to the environment. Students will obtain an understanding of the behavior of institutions and organizations associated with natural resource management.

Professionals associated with natural resources need to consider legislative mandates, community interests, resource evaluation and competing uses, and conflict management techniques. This emphasis prepares the student for work in private industry, public and non-profit agencies, and graduate school. Students must select 24 hours of restricted electives from an approved list in consultation with their advisor. The remaining nine hours are free electives.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
<td>3</td>
</tr>
</tbody>
</table>

1. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement.
2. This course satisfies the oral communication (C) course requirement.
3. This course satisfies the writing (W) course requirement.
The Department of Recreation, Park and Tourism Sciences offers an 18 credit hour minor in Park and Natural Resource Management as a supplement to other majors. The minor focuses on management of natural and cultural resources associated with conserving parks and other protected areas. Land managers and related professionals integrate concepts in the bio-environmental sciences, social and behavioral sciences, and policy and administrative decision-making. Students with an emphasis in this field look forward to careers with both public and private employers in the recreation, park, and tourism fields, including state and federal agencies and private enterprises, non-profit organizations, youth camps, and environmental education programs.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 201</td>
<td>Foundations of Recreation, Parks and Tourism</td>
<td>3</td>
</tr>
<tr>
<td>or RPTS 301</td>
<td>Leisure and Outdoor Recreation in American Culture</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 307</td>
<td>Methods of Environmental Interpretation</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 316</td>
<td>Recreational Management of Wildlands</td>
<td>3</td>
</tr>
</tbody>
</table>

**College, University Requirements**

- AGEC 105 Introduction to Agricultural Economics: 3
- BIOL 101 Botany: 4
- or BIOL 113 or Essentials in Biology
- CHEM 101 Fundamentals of Chemistry I & CHEM 111 and Fundamentals of Chemistry Laboratory I: 4
- RENR 215 Fundamentals of Ecology-Laboratory: 1
- American history electives (p. 25) 3: 6
- Communications electives (p. 22) 3: 6
- Creative arts elective (p. 24) 3: 3
- Government/Political science electives (p. 25) 4: 6
- Language, philosophy, and cultural elective (p. 23): 3
- Mathematics electives (MATH prefix preferred) (p. 22): 6

**Total Semester Credit Hours**: 120

1. Students will complete an internship, study abroad or independent research experience.
2. To be selected from an approved list in consultation with an advisor.
3. The graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
4. Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.
RPTS 402  Park Planning and Design  3
Select at least one of the following:  3-6
  RENR 345  Park Ecology and Management
  RPTS 300  Supervised Field Studies
  RPTS 460/RENR 460  Nature, Values, and Protected Areas
May select one of the following:  0-3
  ARCH 213  Sustainable Architecture
  ESSM 308  Fundamentals of Environmental Decision-Making
  GEOG 202  Geography of the Global Village
  GEOG 205  Environmental Change
  RENR 375  Conservation of Natural Resources
  WFSC 301  Wildlife and the Changing Environment
  WFSC 303  Fish and Wildlife Laws and Administration
  WFSC 304  Wildlife and Fisheries Conservation
Total Semester Credit Hours  18

1 If you do not wish to take an online course, see RPTS Academic Advisor for course substitutions.

Students must make a grade of "C" or better in all courses.

An internship (RPTS 484) is available for minors above the required 18 hours.

Recreation, Park and Tourism Sciences - Minor

Overview

The Department of Recreation, Park and Tourism Sciences offers a general 18-hour minor as a supplement to other majors. The minor requires RPTS 201 and RPTS 302. Students select four additional courses from a list of ten.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 201</td>
<td>Foundations of Recreation, Parks and Tourism</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 302</td>
<td>Application of Tourism Principles</td>
<td>3</td>
</tr>
<tr>
<td>Select four from the following:</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>RPTS 300</td>
<td>Supervised Field Studies</td>
<td></td>
</tr>
<tr>
<td>RPTS 301</td>
<td>Leisure and Outdoor Recreation in American Culture</td>
<td></td>
</tr>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td></td>
</tr>
<tr>
<td>RPTS 307</td>
<td>Methods of Environmental Interpretation</td>
<td></td>
</tr>
<tr>
<td>RPTS 308</td>
<td>Foundations of Community and Community Development</td>
<td></td>
</tr>
<tr>
<td>RPTS 311</td>
<td>Planning and Implementation of Events and Programs</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours  18

Students must make a grade of "C" or better in all courses.

An internship (RPTS 484) is available for minors above required 18 hours.

Tourism Management - Minor

The Department of Recreation, Park and Tourism Sciences offers an 18 credit hour minor in Tourism Management as a supplement to other majors. The minor focuses on the planning, management, development, and promotion of places and events as tourism attractions. Courses in tourism are designed to collectively build understanding about the linkages that exist between local places and cultures, host populations, and various public, private, and special interest groups. The minor requires RPTS 302 and RPTS 311. Students select four additional courses from a list of nine.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 302</td>
<td>Application of Tourism Principles</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 311</td>
<td>Planning and Implementation of Events and Programs</td>
<td>3</td>
</tr>
<tr>
<td>Select four of the following:</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>RPTS 300</td>
<td>Supervised Field Studies</td>
<td></td>
</tr>
<tr>
<td>RPTS 320</td>
<td>Event Management and Operations I (Select four courses from the following)</td>
<td></td>
</tr>
<tr>
<td>RPTS 331</td>
<td>Tourism Marketing</td>
<td></td>
</tr>
<tr>
<td>RPTS 340</td>
<td>Recreation, Parks, Tourism and Diverse Populations</td>
<td></td>
</tr>
<tr>
<td>RPTS 360</td>
<td>Ecotourism: Principles and Practices</td>
<td></td>
</tr>
<tr>
<td>RPTS 421</td>
<td>Hotel and Resort Operations</td>
<td></td>
</tr>
<tr>
<td>RPTS 423</td>
<td>Tourism Management</td>
<td></td>
</tr>
<tr>
<td>RPTS 426</td>
<td>Tourism Impacts (W Course)</td>
<td></td>
</tr>
<tr>
<td>RPTS 444</td>
<td>Service Quality for Hospitality Organizations</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours  18

Students must make a grade of "C" or better in all courses.

An internship (RPTS 484) is available for minors above required 18 hours.

Youth Development - Minor

Overview

The Department of Recreation, Park and Tourism Sciences offers an 18 hour minor in Youth Development as a supplement to other majors. The minor focuses on programs and services that contribute to the...
development of young people's personal, physical, social and educational abilities. Youth workers are program developers, leaders and managers who need to be able to work with youth, families, organizations and communities. Coursework in this option focuses on positive youth development, program planning and evaluation, methods for working with young people, and societal factors that both contribute to and inhibit the development of young people.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 370</td>
<td>Youth Development Organizations and Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 371</td>
<td>Understanding and Developing Effective Skills for Youth Development</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 474</td>
<td>Management of Programs and Services for Youth</td>
<td>3</td>
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</table>

Select three of the following: 9

- RPTS 300 Supervised Field Studies
- RPTS 302 Application of Tourism Principles
- RPTS 307 Methods of Environmental Interpretation
- RPTS 308 Foundations of Community and Community Development
- RPTS 311 Planning and Implementation of Events and Programs
- RPTS 340 Recreation, Parks, Tourism and Diverse Populations
- RPTS 476 Leadership for Outdoor Recreation
- RPTS 478 Youth Development Practice

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

An internship (RPTS 484) is available for minors above required 18 hours.

### Community Recreation and Park Administration - Certificate

Management of recreation, park and leisure-service agencies requires expertise in problem-solving, decision-making, assessment of social and environmental impacts, personnel, public relations, volunteer management, financing and fund-raising, marketing of services, and needs assessments. Skills in working with people in the legal and political environment are necessary, as well as the ability to assess and work with other organizations for cooperative developments in recreation and tourism. Utilizing computer based decision-aids, students in this emphasis prepare for managerial careers with public recreation and park agencies, youth agencies, not-for-profit recreation agencies, and commercial recreation enterprises.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 209</td>
<td>Park and Tourism Operations</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td>3</td>
</tr>
<tr>
<td>or RPTS 423</td>
<td>or Tourism Management</td>
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<tr>
<td>RPTS 370</td>
<td>Youth Development Organizations and Services</td>
<td>3</td>
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<tr>
<td>RPTS 402</td>
<td>Park Planning and Design 1</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 403</td>
<td>Financing and Marketing Recreation, Park and Tourism Resources 2</td>
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<tr>
<td>Departmental electives (p. 950)</td>
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<td>3</td>
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</tbody>
</table>

Total Semester Credit Hours 19

1. C Course
2. W Course

### Hospitality Management - Certificate

The Certificate in Hospitality Management, offered by the Department of Recreation, Park and Tourism Sciences, is designed to provide students with an understanding of the planning, analysis, and decision-making techniques needed for management positions in the tourism and hospitality industries. Students will study and develop skills related to principles of management, sustainability, development, cultural tolerance, marketing, finance, and service quality as they apply to the hospitality and tourism industries.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 302</td>
<td>Application of Tourism Principles</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 331</td>
<td>Tourism Marketing</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 421</td>
<td>Hotel and Resort Operations</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 423</td>
<td>Tourism Management</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 444</td>
<td>Service Quality for Hospitality Organizations</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

This Certificate requires a minimum of 15 credit hours of designated courses, all of which are to be taken online. If a student has taken the on-campus version of any course prior to enrollment in the Certificate, it may be substituted for the on-line version with permission of the RPTS academic advisor. Students must earn a grade of a "C" or better in each course used to meet the requirements, and an overall average of at least a 2.5 in applicable coursework.

### Parks and Conservation - Certificate

This option focuses on management of natural and cultural resources associated with conserving parks, and other protected areas, while also providing for their use by people. Land managers and related professionals operate within a variety of forums that require the integration of concepts in the environmental, social and behavioral sciences, along with policy and administrative decision-making. Necessary skills include computer applications for natural resource management, planning and design related to natural and cultural resources. Students with an option in this field look forward to careers with both public and private employers in the recreation, park and tourism
fields, including state and federal agencies and private enterprises, non-
profit organizations, camps and environmental education programs.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RENR 460/RPTS 460</td>
<td>Nature, Values, and Protected Areas</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 307</td>
<td>Methods of Environmental Interpretation</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 316</td>
<td>Recreational Management of Wildlands</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 402</td>
<td>Park Planning and Design ¹</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 403</td>
<td>Financing and Marketing Recreation, Park and Tourism Resources</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 19

¹ C Course
² W Course

Professional Event Manager - Certificate

The Professional Event Manager Certificate (PEMC), offered by the Department of Recreation, Park and Tourism Sciences, is designed to provide students with an understanding of and the ability to plan, implement, and evaluate festivals, fairs and special events in a variety of governmental, not-for-profit and commercial settings. This certificate is open to all majors.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td>3</td>
</tr>
<tr>
<td>or RPTS 423</td>
<td>Tourism Management</td>
<td></td>
</tr>
<tr>
<td>RPTS 311</td>
<td>Planning and Implementation of Events and Programs</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 320</td>
<td>Event Management and Operations I</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 321</td>
<td>Event Management and Operations II</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:¹</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>AGCJ 306</td>
<td>Theory and Practice of Agricultural Public Relations</td>
<td></td>
</tr>
<tr>
<td>ALED 344</td>
<td>Leadership of Volunteers</td>
<td></td>
</tr>
<tr>
<td>RPTS 331</td>
<td>Tourism Marketing</td>
<td></td>
</tr>
<tr>
<td>Class on Event Management Program Coordinating Committee elective courses list</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

¹ Students should review the list of electives prepared by the Event Management Program Coordinating Committee. The courses listed are included on the full list.

Tourism Management - Certificate

Tourism is one of the world's largest and most diverse industries. To help students prepare for tourism careers, this option area introduces issues pertaining to the management, development, and promotion of places and events as tourism attractions. Courses in tourism are designed to collectively build understanding about the links that exist between local places, host populations, and various public, private and special interest groups. Students also develop competencies in assessing economic, environmental, social and political impacts of tourism, as well as in tourism marketing. Students in this option can pursue careers in private sector enterprises, government agencies, convention and visitor bureaus, and other tourism-related service organizations.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 320</td>
<td>Event Management and Operations I</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 331</td>
<td>Tourism Marketing</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 401</td>
<td>Tourism and Recreation Enterprises (each is a W course)</td>
<td>4</td>
</tr>
<tr>
<td>or RPTS 403</td>
<td>or Financing and Marketing Recreation, Park and Tourism Resources</td>
<td></td>
</tr>
<tr>
<td>RPTS 423</td>
<td>Tourism Management</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 426</td>
<td>Tourism Impacts (W course)</td>
<td>3</td>
</tr>
<tr>
<td>Departmental electives</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 19

Youth Development - Certificate

This option focuses on programs and services that contribute to the development of young people's personal, physical, social and educational abilities. Youth workers are program developers, leaders and managers who need to be able to work with youth, families, organizations and communities. Coursework in this option focuses on positive youth development, program planning and evaluation, methods for working with young people, and societal factors that both contribute to and inhibit the development of young people. Students with an option in this field look forward to careers with non-profit, public and for-profit agencies that supply youth development opportunities for young people. Settings include after-school programs, community programs, camps, outdoor adventure and church-related recreation programs.
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTS 304</td>
<td>Administration of Recreation Resource Agencies</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 370</td>
<td>Youth Development Organizations and Services</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 371</td>
<td>Understanding and Developing Effective Skills for Youth Development</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 403</td>
<td>Financing and Marketing Recreation, Park and Tourism Resources (W Course)</td>
<td>4</td>
</tr>
<tr>
<td>RPTS 474</td>
<td>Management of Programs and Services for Youth (W Course)</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 478</td>
<td>Youth Development Practice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>19</td>
</tr>
</tbody>
</table>

Department of Soil and Crop Sciences

Undergraduate Students who complete the undergraduate course of study receive the degree of Bachelor of Science in Plant and Environmental Soil Science and Turfgrass Science.

The B.S. degrees require a minimum of 120 credit hours. Details of course requirements are given below and in the Texas A&M University Undergraduate Catalog. Information on undergraduate admissions, including how to order a catalog, can be obtained from the Office of Admissions (http://admissions.tamu.edu). We encourage prospective students to make an appointment with an academic advisor prior to applying.

Undergraduates are required to complete an internship, undergraduate research or study abroad. Soil and Crop Sciences offers a wide variety of experiential learning opportunities for students to achieve their graduation needs. Students are able to complete their experiential learning requirement regionally, nationally, or internationally. Information about undergraduate research and internship opportunities can be obtained from students’ academic advisors and professors.

Faculty

Aitkenhead, Jacqueline A, Associate Professor
Soil & Crop Sciences
PHD, University of New Hampshire, 2000

Awika, Joseph M, Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2003

Bagavathiannan, Muthukumar V, Assistant Professor
Soil & Crop Sciences
PHD, University of Manitoba, Canada, 2010

Baltensperger, David D, Professor
Soil & Crop Sciences
PHD, New Mexico State University, 1981

Cralle, Harry T, Associate Professor
Soil & Crop Sciences
PHD, University of Minnesota, Twin Cities, 1979

Deng, Youjun, Associate Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2001

Finlayson, Scott A, Associate Professor
Soil & Crop Sciences
PHD, University of Calgary, 1994

Gentry, Terry J, Professor
Soil & Crop Sciences
PHD, University of Arizona, 2003

Hague, Steven S, Associate Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2000

Hays, Dirk B, Professor
Soil & Crop Sciences
PHD, University of Calgary, 1997

Heilman, James L, Professor
Soil & Crop Sciences
PHD, Kansas State University, 1977

Herman, Tim, Professor
Soil & Crop Sciences
PHD, University of Idaho, 1992

Ibrahim, Amir M, Professor
Soil & Crop Sciences
PHD, Colorado State University, 1998

Jessup, Russell W, Associate Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2005

McInnes, Kevin J, Professor
Soil & Crop Sciences
PHD, Kansas State University, 1985

Morgan, Cristine L, Professor
Soil & Crop Sciences
PHD, University of Wisconsin - Madison, 2003

Murray, Seth C, Associate Professor
Soil & Crop Sciences
PHD, Cornell University, 2008

Neely, Haly L, Assistant Professor
Soil & Crop Sciences
PHD, Texas A&M University, 2014

Okumoto, Sakiko, Associate Professor
Soil & Crop Sciences
PHD, Tubingen University, 2003

Rajan, Nithya, Associate Professor
Soil & Crop Sciences
PHD, Texas Tech University, 2007
Redmon, Larry, Professor and Extension Specialist
Soil & Crop Sciences
MWS, Texas A&M University, 2010
PHD, Texas A&M University, 1992

Rooney, William L, Professor
Soil & Crop Sciences
PHD, University of Minnesota, Twin Cities, 1992

Schwab, Arthur P, Professor
Soil & Crop Sciences
PHD, Colorado State University, 1981

Septiningsih, Endang M, Assistant Professor
Soil & Crop Sciences
PHD, Cornell University, 2002

Smith, C W, Professor
Soil & Crop Sciences
PHD, University of Tennessee, 1974

Stelly, David M, Professor
Soil & Crop Sciences
PHD, University of Wisconsin - Madison, 1983

Thomson, Michael J, Professor
Soil & Crop Sciences
PHD, Cornell University, 2002

White, Richard H, Professor
Soil & Crop Sciences
PHD, Virginia Polytechnic Institute and State University, 1985

Zhang, Hongbin, Professor
Soil & Crop Sciences
PHD, University of California, Davis, 1990

Majors

- Bachelor of Science in Plant and Environmental Soil Science, Crops Emphasis (p. 197)
- Bachelor of Science in Plant and Environmental Soil Science, Soil and Water Emphasis (p. 198)
- Bachelor of Science in Turfgrass Science (p. 199)

Minors

- Agronomy Minor (p. 200)
- Environmental Soil Science Minor (p. 200)
- Plant Breeding Minor (p. 201)

Plant and Environmental Soil Science - BS, Crops Emphasis

Curriculum in Plant and Environmental Soil Science is administered by the Department of Soil and Crop Sciences. Students following this curriculum develop and utilize basic scientific knowledge to understand the most fundamental resources—plants, soils, and water—and the interaction of these resources in different environmental settings. The required courses provide an essential foundation in several disciplines, while the elective courses can be selected to meet the interests, needs and objectives of individual students.

Based on professional goals and objectives, students will select an emphasis in crops or soil and water. The crops emphasis focuses on the principles involved in the production, management, marketing and use of fiber, forage, grain, biofuel and oilcrops. In the soil and water emphasis, students will study the nature, properties, management, conservation, and use of soils and water. The graduate in Plant and Environmental Soil and Science may choose a career in: education—consulting, extension, or public relations; production agriculture—biofuel or seed production, farming, or farm management; soil and water resource management—soil surveying, land appraisal, land use planning, conservation and pollution abatement, or watershed management; environmental—pollution control and environmental protection as affected by plant-soil-water interactions.

Flexible curricula are provided so that each student, in consultation with their academic advisor, can design a degree program that best serves the student’s career objectives.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 222</td>
<td>Elements of Organic and Biological Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 205</td>
<td>Problem Solving in Plant and Soil Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 307</td>
<td>Crop Biology and Physiology</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 309</td>
<td>Water in Soils and Plants</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 481</td>
<td>Senior Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

Experiential requirement

Select one of the following:

- SCSC 420 Brazilian Agriculture and Food Production Systems
- SCSC 421 International Agricultural Research Centers - Mexico
- SCSC 423 Natural Resources and Agricultural Sustainability in UK
- SCSC 484 Internship
- SCSC 491 Research

Pest Management

Select two of the following:

- PLPA 301 Plant Pathology & PLPA 303 and Plant Pathology Laboratory
- ENTO 201 General Entomology
- ENTO 401 Principles of Integrated Pest Management
- SCSC 446 Weed Management and Ecology

Ecology

- RENR 205 Fundamentals of Ecology 3
or SCSC 444 or Forage Ecology and Management

<table>
<thead>
<tr>
<th>Crops Emphasis</th>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>SCSC 304</td>
<td>Plant Breeding and Genetics</td>
<td>3</td>
<td></td>
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<tr>
<td>SCSC 311</td>
<td>Principles of Crop Production</td>
<td>3</td>
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<tr>
<td>SCSC 402</td>
<td>Crop Stress Management</td>
<td>4</td>
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<tr>
<td>SCSC 410</td>
<td>International Agricultural Systems</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SCSC 441</td>
<td>Advances in Agronomic Sciences</td>
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</table>

Directed electives $^1$ 9

Free electives 16-17

**University Core Curriculum Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 111 &amp; Fundamentals of Chemistry Laboratory I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>American history elective (p. 25)</td>
<td>6</td>
<td></td>
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<tr>
<td>Communication elective (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Creative arts elective (p. 24) $^2$</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Government/Political science elective (p. 25) $^3$</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture elective (p. 23) $^2$</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences</td>
<td></td>
<td></td>
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</table>

Select from the following: 5

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td></td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td></td>
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<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
<td></td>
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<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td></td>
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<tr>
<td>GEOL 101</td>
<td>Principles of Geology</td>
<td></td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td></td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td></td>
</tr>
</tbody>
</table>

Mathematics elective (MATH prefix required) (p. 22) 6

Total Semester Credit Hours 120

$^1$ To be selected from crops emphasis courses.

$^2$ The Graduation requirements include a requirement for six hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.

$^3$ Credit by examination may be used to substitute for courses.

**Plant and Environmental Soil Science - BS, Soil and Water Emphasis**

Curriculum in Plant and Environmental Soil Science is administered by the Department of Soil and Crop Sciences. Students following this curriculum develop and utilize basic scientific knowledge to understand the most fundamental resources—plants, soils, and water—and the interaction of these resources in different environmental settings. The required courses provide an essential foundation in several disciplines, while the elective courses can be selected to meet the interests, needs and objectives of individual students.

Based on professional goals and objectives, students will select an emphasis in crops or soil and water. The crops emphasis focuses on the principles involved in the production, management, marketing and use of fiber, forage, grain, biofuel and oilcrops. In the soil and water emphasis, students will study the nature, properties, management, conservation, and use of soils and water. The graduate in Plant and Environmental Soil and Science may choose a career in: education—consulting, extension, or public relations; production agriculture—biofuel or seed production, farming, or farm management; soil and water resource management—soil surveying, land appraisal, land use planning, conservation and pollution abatement, or watershed management; environmental—pollution control and environmental protection as affected by plant-soil-water interactions.

Flexible curricula are provided so that each student, in consultation with their academic advisor, can design a degree program that best serves the student’s career objectives.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 222</td>
<td>Elements of Organic and Biological Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 205</td>
<td>Problem Solving in Plant and Soil Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 307</td>
<td>Crop Biology and Physiology</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 309</td>
<td>Water in Soils and Plants</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 481</td>
<td>Senior Seminar</td>
<td>2</td>
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</table>

Experiential requirement

Select one of the following: 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSC 420</td>
<td>Brazilian Agriculture and Food Production Systems</td>
<td></td>
</tr>
<tr>
<td>SCSC 421</td>
<td>International Agricultural Research Centers - Mexico</td>
<td></td>
</tr>
<tr>
<td>SCSC 423</td>
<td>Natural Resources and Agricultural Sustainability in UK</td>
<td></td>
</tr>
<tr>
<td>SCSC 484</td>
<td>Internship</td>
<td></td>
</tr>
<tr>
<td>SCSC 491</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods or ESSM 313 or Vegetation Sampling Methods and Designs in Ecosystems</td>
<td>3</td>
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</tbody>
</table>

**Pest Management**

Select two of the following: 7-8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLPA 301</td>
<td>Plant Pathology &amp; PLPA 303 and Plant Pathology Laboratory</td>
<td></td>
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<tr>
<td>ENTO 201</td>
<td>General Entomology</td>
<td></td>
</tr>
<tr>
<td>ENTO 401</td>
<td>Principles of Integrated Pest Management</td>
<td></td>
</tr>
<tr>
<td>SCSC 446</td>
<td>Weed Management and Ecology</td>
<td></td>
</tr>
</tbody>
</table>

**Ecology**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology or SCSC 444 or Forage Ecology and Management</td>
<td>3</td>
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</tbody>
</table>

**Soil and Water Emphasis**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEG 390</td>
<td>Principles of Geographic Information Systems</td>
<td>4</td>
</tr>
</tbody>
</table>
Turfgrass Science - BS

Curriculum in Turfgrass Science is administered by the Department of Soil and Crop Sciences. Students following this curriculum develop and utilize basic scientific knowledge to understand the most fundamental resources—turfgrass, soils, and water—and the interaction of these resources in different environmental settings. The required courses provide an essential foundation, while the elective courses (i.e., ornamental horticulture, plant protection, business, landscape architecture) can be selected to meet the interests, needs and objectives of individual students.

Turfgrass Science prepares graduates for careers in: management—golf courses, athletic fields, public, private or commercial grounds; production agriculture—turfgrass production, or plant breeding; agribusiness—seed sales, turf equipment and supplies, landscape contractor, commercial or home lawn care specialists; education—consulting, extension, or public relations.

Program Requirements

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CHEM 222</td>
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<tr>
<td>SCSC 205</td>
<td>Problem Solving in Plant and Soil Management</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 307</td>
<td>Crop Biology and Physiology</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 309</td>
<td>Water in Soils and Plants</td>
<td>4</td>
</tr>
<tr>
<td>SCSC 481</td>
<td>Senior Seminar</td>
<td>2</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology or SCSC 44- or Forage Ecology and Management</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 420</td>
<td>Brazilian Agriculture and Food Production Systems</td>
<td></td>
</tr>
<tr>
<td>SCSC 421</td>
<td>International Agricultural Research Centers - Mexico</td>
<td></td>
</tr>
<tr>
<td>SCSC 423</td>
<td>Natural Resources and Agricultural Sustainability in UK</td>
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<tr>
<td>SCSC 484</td>
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<tr>
<td>SCSC 491</td>
<td>Research</td>
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<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
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<td>SCSC 446</td>
<td>Weed Management</td>
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<tr>
<td>ENTO 401</td>
<td>Principles of Integrated Pest Management</td>
<td></td>
</tr>
<tr>
<td>SCSC 302</td>
<td>Recreational Turf</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 312</td>
<td>Professional Development in Turfgrass</td>
<td>1</td>
</tr>
<tr>
<td>SCSC 427</td>
<td>Sports Field Construction</td>
<td>4</td>
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<tr>
<td>SCSC 428</td>
<td>Advanced Turf Ecology and Physiology</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 429</td>
<td>Turf Management Systems</td>
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<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
<td>3</td>
</tr>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
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<tr>
<td>BIOL 111</td>
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<tr>
<td>CHEM 101</td>
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<td>4</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<td></td>
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<tr>
<td>PLPA 303</td>
<td>Plant Pathology Laboratory</td>
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<td>SCSC 302</td>
<td>Recreational Turf</td>
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<tr>
<td>SCSC 312</td>
<td>Professional Development in Turfgrass</td>
<td>1</td>
</tr>
<tr>
<td>SCSC 427</td>
<td>Sports Field Construction</td>
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<td>SCSC 429</td>
<td>Turf Management Systems</td>
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</tr>
<tr>
<td>SCSC 446</td>
<td>Weed Management</td>
<td></td>
</tr>
</tbody>
</table>

1. To be selected from soils emphasis courses.
2. The Graduation requirements include a requirement for six hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
3. Credit by examination may be used to substitute for courses.
Agronomy - Minor

The Department of Soil and Crop Sciences offers a minor in Agronomy. SCSC 105, Food & Fiber or SCSC 205, Problem Solving in Plant and Soil Science and SCSC 301, Soil Science are required. Select an additional 8 hours of course work within Soil and Crop Sciences. Please speak with an advisor concerning courses prior to registering.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
</tr>
</tbody>
</table>

Select eight semester credit hours from the following:

- SCSC 304 Plant Breeding and Genetics
- SCSC 402 Crop Stress Management
- SCSC 405 Soil and Water Microbiology
- SCSC 422 Soil Fertility and Plant Nutrient Management
- SCSC 432 Soil Fertility and Plant Nutrient Management Laboratory
- SCSC 458 Watershed, Water and Soil Quality Management

Free electives 11-12

Environmental Soil Science - Minor

The Department of Soil and Crop Sciences offers a minor in Environmental Soil Sciences. SCSC 301, Soil Science is required. You may select from the 11 hours of soil science courses. See an advisor in for more details.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td>4</td>
</tr>
</tbody>
</table>

Select from the following:

- SCSC 304 Plant Breeding and Genetics
- SCSC 401/ FIVS 401 Forensic Soil Science
- SCSC 405 Soil and Water Microbiology
- SCSC 422 Soil Fertility and Plant Nutrient Management
- SCSC 432 Soil Fertility and Plant Nutrient Management Laboratory
- SCSC 455 Environmental Soil and Water Science

Total Semester Credit Hours 15

Students must make a grade of "C" or better in all courses.
Plant Breeding - Minor

Overview

The Department of Soil and Crop Sciences offers a Minor in Plant Breeding. SCSC 304, plant breeding and genetics, and GENE 310, principles of heredity, are required courses. Students select an additional nine hours of course work and a ‘C’ or better is required in all coursework. GENE 301 may be substituted for GENE 310. Plant breeding minor offers the opportunity for students to explore their interest in applied biological sciences in the areas of plant breeding, crop improvement, crop biotechnology, and genetics. Students must have an overall GPA of 2.75 or better to enter the program.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENE 310</td>
<td>Principles of Heredity</td>
<td>3</td>
</tr>
<tr>
<td>SCSC 304</td>
<td>Plant Breeding and Genetics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select nine hours of the following:</td>
<td></td>
</tr>
<tr>
<td>GENE 411/MEPS 411</td>
<td>Biotechnology for Crop Improvement</td>
<td></td>
</tr>
<tr>
<td>SCSC 301</td>
<td>Soil Science</td>
<td></td>
</tr>
<tr>
<td>SCSC 305</td>
<td>Professional Development in Agronomy</td>
<td></td>
</tr>
<tr>
<td>SCSC 311</td>
<td>Principles of Crop Production</td>
<td></td>
</tr>
<tr>
<td>SCSC 402</td>
<td>Crop Stress Management</td>
<td></td>
</tr>
<tr>
<td>SCSC 410</td>
<td>International Agricultural Systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

1 GENE 301 may be substituted for GENE 310. Must have an overall GPA of 2.75 to enter program.

University Studies Programs

The College of Agriculture and Life Sciences offers degrees in University Studies. A University Studies degree differs from a traditional “major” in that it consists of a concentration of 26 hours and two minors of 15-18 hours each. The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

Majors

- Bachelor of Science in University Studies, Environmental Business Concentration (p. 183)
- Bachelor of Science in University Studies, Leadership Studies Concentration (p. 135)

University Studies - BS, Environmental Business Concentration

A University Studies Degree differs from a traditional “major” in that it consists of a concentration of 21-24 hours and two minors of 15-18 hours each. The University Studies Degree format was created to provide students the flexibility to combine areas of study that are of special interest. Under the guidelines of the University Studies degree requirements, the student’s diploma will list “University Studies” in the place where the major is currently listed. The student’s area of concentration (Environmental Business) and the two minors (Rangeland Ecology & Management AND Business) will be indicated on the student’s transcript.

This new degree option features a blending of environmental science coursework and business coursework in a uniquely unique combination unlike any other degree at Texas A&M University. The Environmental Business concentration draws heavily from the established Bioenvironmental Sciences degree already offered at Texas A&M, but this concentration is significantly different in that it lacks the larger number of life science courses that serve as a necessary foundation in any environmental science degree. The focus on environmental coursework (through the BESC and ESSM courses) coupled with core business coursework allows this University Studies concentration to provide a very well-rounded and marketable degree in a variety of arenas.

This interdisciplinary degree plan provides a highly-marketable focus from an already fast-rising, multi-faceted discipline. The coursework retains the “customizable” nature of the university studies degree within the concentration itself, allowing students a truly one-of-a-kind opportunity for their bachelor’s degree. The Environmental Business concentration provides a solid foundation of Bioenvironmental Sciences coursework that, when paired with the Rangeland Ecology & Management minor and the Business minor, provides students with a versatile, sound degree that is uniquely positioned in the job market and combines a general overview of both environmental issues/policies and business administration principals/content.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
<td>3</td>
</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
<td>3</td>
</tr>
<tr>
<td>BESC 481</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>BESC 484</td>
<td>Field Experience</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry &amp; CHEM 111</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology &amp; RENR 215</td>
<td>4</td>
</tr>
<tr>
<td>BESC concentration electives</td>
<td>Select three of the following:</td>
<td>9</td>
</tr>
<tr>
<td>BESC 204</td>
<td>Molds and Mushrooms: The Impact of Fungi on Society and the Environment</td>
<td></td>
</tr>
<tr>
<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
<td></td>
</tr>
<tr>
<td>BESC 320</td>
<td>Water and the Bioenvironmental Sciences</td>
<td></td>
</tr>
<tr>
<td>BESC 357</td>
<td>Biotechnology for Biofuels and Bioproducts</td>
<td></td>
</tr>
</tbody>
</table>
BESC 489  Special Topics in...

PLPA 301  Plant Pathology
& PLPA 303 and Plant Pathology Laboratory

Communication (p. 22)  3
Creative arts (p. 24)  3
Language, philosophy and culture (p. 23)  3
Mathematics (p. 22)  6
Social and behavioral science (p. 25)  3
American history (p. 25)  6
POLS 206  American National Government  3
POLS 207  State and Local Government  3
Free electives  22
Business Minor  18
Rangeland Ecology and Management Minor  16

Total Semester Credit Hours  120

1  The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.

**Business Minor**

The minor in business consists of six specific courses chosen to develop a foundational knowledge in the basic aspects of business, including accounting, finance, management, marketing, and management information systems.

The courses listed below constitute the 18 hours required for a minor in business.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles (or TCCNS ACCT 2301 or 2401)</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society (or Blinn College BUSI 2371)</td>
<td>3</td>
</tr>
<tr>
<td>FINC 409</td>
<td>Survey of Finance Principles</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 409</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours  18

1  Course must be taken in residence at Texas A&M. No transfer courses or substitutions will be allowed.
2  Credit by exam is offered for students who have not taken ISTM 209 but can demonstrate mastery of the concepts. See dars.tamu.edu/testing.
3  MGMT 212 cannot be used to meet this requirement.

Students must make a grade of "C" or better in all courses.

**University Studies - BS, Leadership Studies Concentration**

A University Studies Degree is an interdisciplinary major that consists of a concentration of 26 hours and two minors of 15-18 hours each. The University Studies Degree format was created to provide students the flexibility to combine areas of study that are of special interest. University Studies - Leadership Studies is administered by the Department of Agricultural Leadership, Education, and Communications. In the leadership studies concentration, students learn theories and models of the leadership process and they use analysis and evaluation to synthesize multiple leadership theories. This interdisciplinary program allows you the ability to customize your higher educational experience to your future career goals unlike any other degree at Texas A&M University. This innovative degree empowers you to develop an understanding of foundational leadership theory in your chosen context. The student, with support from the advisor, will choose minors to assist them in creating a degree plan that will allow students to gain the knowledge and skills required for their chosen career path.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALEC 201</td>
<td>Foundations of Agricultural Leadership, Education and Communications</td>
<td>2</td>
</tr>
<tr>
<td>ALED 202</td>
<td>Introduction to Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALED 301</td>
<td>Personal Leadership Education</td>
<td>3</td>
</tr>
<tr>
<td>ALED 340</td>
<td>Survey of Leadership Theory</td>
<td>3</td>
</tr>
<tr>
<td>ALED 424</td>
<td>Applied Ethics in Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ALED 440</td>
<td>Leading Change</td>
<td>3</td>
</tr>
</tbody>
</table>
ALED 481 Seminar 3
Agricultural leadership and development electives 6
(p. 715)
American history (p. 25) 6
POLS 206 American National Government 6
&POLS 207 and State and Local Government Communication (p. 22) 6
Creative arts (p. 24) 3
Language, philosophy and culture (p. 23) 3
Life and physical sciences (p. 22) 3
Mathematics (p. 22) 6
Social and behavioral sciences (p. 25) 3
Minor 1 2
Minor 2 2
Electives 15-18
15-18
16-22
Total Semester Credit Hours 120

1 Before registering as a junior, each student must develop a degree program in consultation with the departmental advisor.
2 The total number of hours between Minor 1, Minor 2 and electives must be 53 hours. Courses counting in other areas of the degree plan and toward a minor cannot count toward the 53 total hours. Must meet with an advisor to determine correct hours.

Students are required to make a C or better for each of their courses in the major coursework and both Minor Areas.

At least 36 credits must be 300- and 400-level courses.

The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement.

Department of Wildlife and Fisheries Sciences

The Department of Wildlife and Fisheries Sciences uses the latest in the ecological and management disciplines to provide the most diverse and progressive education available in the protection of the earth’s biodiversity. Students in this department are interested in making contributions to solving problems associated with the extinction of species, wildlife recreational uses, food production from aquaculture, environmental education, wildlife management, and urban wildlife and fisheries recreational activities.

The conservation and management of wildlife and fisheries resources require resolution of increasingly complex issues that extend far beyond the bounds of classical biology. Contemporary wildlife and fisheries professionals must be well-versed in the life and physical sciences, mathematics, and the language, philosophy and culture. Today’s professionals must have a problem-solving orientation that accommodates animals and their habitats within a larger ecological and socio-economic system. In addition, modern students must be familiar with molecular genetics and the principles of conservation biology. Curricula in wildlife and fisheries sciences are designed to provide both the traditional and contemporary dimensions of academic instruction necessary to transform motivated and intellectually capable students into competent professionals.

Faculty

Barboza, Peregrine S, Professor
Wildlife & Fisheries Sciences
PHD, University of New England, 1991

Bixler, Richard P, Lecturer
Wildlife & Fisheries Sciences
PHD, Colorado State University, 2014

Conway, Kevin W, Associate Professor
Wildlife & Fisheries Sciences
PHD, Saint Louis University, 2010

Dewitt, Thomas J, Associate Professor
Wildlife & Fisheries Sciences
PhD, State University of New York at Binghamton, 1996

Dronen, Norman O, Professor
Wildlife & Fisheries Sciences
PHD, New Mexico State University, 1974

Fitzgerald, Lee A, Professor
Wildlife & Fisheries Sciences
PHD, University of New Mexico, 1993

Fujiwara, Masami, Associate Professor
Wildlife & Fisheries Sciences
PHD, Massachusetts Institute of Technology, 2002

Gatlin, Delbert M, Professor
Wildlife & Fisheries Sciences
PHD, Mississippi State University, 1983

Grace, Jacquelyn K, Assistant Professor
Wildlife & Fisheries Sciences
PHD, Wake Forest University, 2014

Grant, William E, Professor
Wildlife & Fisheries Sciences
PHD, Colorado State University, 1974

Hurtado Clavijo, Luis A, Associate Professor
Wildlife & Fisheries Sciences
PHD, Rutgers, The State University of New Jersey, 2002

Klassen, Jessica A, Lecturer
Wildlife & Fisheries Sciences
PHD, Florida Atlantic University, 2016

Lacher, Thomas E, Professor
Wildlife & Fisheries Sciences
PHD, University of Pittsburgh, 1980

Light, Jessica E, Associate Professor
Wildlife & Fisheries Sciences
PHD, Louisiana State University, 2005

Masser, Michael P, Professor
Wildlife & Fisheries Sciences
PHD, Texas A&M University, 1986

Mateos, Mariana, Associate Professor
Wildlife & Fisheries Sciences
PHD, Rutgers, The State University of New Jersey, 2002
Mora-Zacarias, Miguel A, Professor
Wildlife & Fisheries Sciences
PHD, University of California, Davis, 1990

Morrison, Mike L, Professor
Wildlife & Fisheries Sciences
PHD, Oregon State University, 1982

Roelke, Daniel L, Professor
Wildlife & Fisheries Sciences
PHD, Texas A&M University, 1997

Silvy, Nova J, Professor
Wildlife & Fisheries Sciences
PHD, Southern Illinois University Carbondale, 1975

Voelker, Gary A, Professor
Wildlife & Fisheries Sciences
PHD, University of Washington, 1998

Winemiller, Kirk O, Professor
Wildlife & Fisheries Sciences
PHD, The University of Texas at Austin, 1987

Yorzinski, Jessica L, Assistant Professor
Wildlife & Fisheries Sciences
PHD, University of California, Davis, 2012

Majors

• Bachelor of Science in Renewable Natural Resources (p. 156)
• Bachelor of Science in Wildlife and Fisheries Sciences,
  (p. 205) Aquatic Ecology and Conservation Option (p. 205)
• Bachelor of Science in Wildlife and Fisheries Sciences, Vertebrate
  Zoology Option (p. 206)
• Bachelor of Science in Wildlife and Fisheries Sciences, Wildlife
  Ecology and Conservation Option (p. 208)

Minors

• Wildlife and Fisheries Sciences Minor (p. 209)

Renewable Natural Resources - BS

Professional Fields of Study and Department Heads

Ecosystem Science and Management, Kathleen Kavanagh, Head
Recreation, Park and Tourism Sciences, Gary D. Ellis, Head
Wildlife and Fisheries Sciences, John B. Carey, Interim Head

General Statement

Three departments offer degrees in specific areas of natural resources management and conservation. Students may select one of these degree programs or a broad approach to natural resource education by pursuing the multi-department degree in Renewable Natural Resources.

Renewable Natural Resources

Renewable Natural Resources (RENR) is for students desiring a rigorous education in the study and management of sustainable ecosystems for a wide variety of resource values. The RENR program of study is comprised of a core of courses and two emphases. The goal of this core/emphasis structure is to provide students with an identity as a renewable natural resources specialist, while, at the same time, affording the flexibility for preparation for a variety of career tracks. One emphasis focuses on management and the other on policy. Technical electives prepare the students in chosen educational and career directions. The underlying goal of the RENR degree is to integrate the scientific issues of renewable natural resources. Graduates of this program will be able to articulate these issues verbally and in writing in their chosen career. Therefore, the RENR degree emphasizes verbal presentations and major papers as well as field-oriented activities.

The RENR programs are designed to help students prepare for careers in public and private organizations associated with the planning and use of natural resources and the environment. Possible employment includes areas such as multi-use land management, environmental assessment, resource inventory, natural resource planning, law, policy analysis and land remediation.

An emphasis may be selected in policy or management. The RENR degree consists of 120 credit hours: 42 university core, 42-45 common to both emphasis areas and 24-27 designated by the emphasis area and 9 free elective hours.

RENR Areas of Emphasis

The BS in Renewable Natural Resources includes two emphasis areas for students to select. The directed electives available from advisors are what differentiates the emphases.

Management Emphasis

Designed for an education in the scientific management of integrated natural resources. In today’s world, it is important to have college graduates prepared to deal with integrated systems, accounting for all of the separate aspects of the system. The management emphasis seeks to prepare the student to integrate concerns related to land, water, air, plants and wildlife into the management process. Students select 24 credit hours of directed electives from an approved list in consultation with their advisor. The remaining 9 credit hours are free electives.

Policy Emphasis

Designed for students desiring an education in natural resources policy. This emphasis incorporates knowledge from all renewable natural resources disciplines, which provides a foundation for decision-making related to the environment. Students will obtain an understanding of the behavior of institutions and organizations associated with natural resource management.

Professionals associated with natural resources need to consider legislative mandates, community interests, resource evaluation and competing uses, and conflict management techniques. This emphasis prepares the student for work in private industry, public and non-profit agencies, and graduate school. Students must select 24 hours of restricted electives from an approved list in consultation with their advisor. The remaining nine hours are free electives.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 313</td>
<td>Vegetation Sampling Methods and Designs in Ecosystems</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Hours</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>ESSM 318</td>
<td>Coupled Social and Ecological Systems</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 351/</td>
<td>Geographic Information Systems for Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>RENR 405</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Conservation of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>RENR 375</td>
<td>Ecosystem Management</td>
<td>4</td>
</tr>
</tbody>
</table>

**Introduction to Natural Resources**

Select one of the following:

- ESSM 102 Introduction to Natural Resources and Ecosystem Management
- ESSM 201 Exploring Ecosystem Science and Management
- WFSC 101 Introduction to Wildlife and Fisheries

**Plant or Animal Taxonomy**

Select one of the following:

- ESSM 203 Forest Trees of North America
- ESSM 302 Wildland Plants of North America
- ESSM 303 Agrostology
- ESSM 304 Rangeland Plant Taxonomy
- WFSC 302 Natural History of the Vertebrates
- WFSC 335 Natural History of the Invertebrates

**Policy**

Select one of the following:

- AGEC 350 Environmental and Natural Resource Economics
- ESSM 406 Natural Resources Policy
- RENR 470 Environmental Impact Assessment
- WFSC 303 Fish and Wildlife Laws and Administration

**Ecological Restoration**

ESSM 320 Ecosystem Restoration and Management

or WFSC 418 or Ecology of the Coastal Zone

**Ecological Processes**

Select two of the following:

- ESSM 306 Plant Functional Ecology and Adaptation
- ESSM 311 Biogeochemistry and Global Change
- SCSC 301 Soil Science
- WFSC 414 Ecology of Lakes and Rivers
- WFSC 428 Wetland Ecosystem Management

**Seminar**

ESSM 481 Senior Seminar

or WFSC 48 Seminar

**Work Experience**

Select one of the following:

- ESSM 484 Internship
- RPTS 484 Internship
- WFSC 484 Internship

Directed electives

Free electives

**College, University Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGEC 105</td>
<td>Introduction to Agricultural Economics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>or BIOL 113 or Essentials in Biology</td>
<td></td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 111 and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>RENR 215</td>
<td>Fundamentals of Ecology-Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>American history electives (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Communications electives (p. 22)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Creative arts elective (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Government/Political science electives (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy, and cultural elective (p. 23)</td>
<td>3</td>
</tr>
</tbody>
</table>

Mathematics electives (MATH prefix preferred) (p. 22)

**Wildlife and Fisheries Sciences - BS, Aquatic Ecology and Conservation Option**

Graduates are well equipped for post-baccalaureate study in many life science fields (graduate school programs and human and veterinary medicine) or for direct entry into professions such as wildlife management, fisheries management, environmental impact assessment, aquaculture, natural history museum education, zoological park collection management, public school teaching and urban wildlife management. Employers of recent graduates include state and federal resource agencies, scientific foundations, ranches, hunting and fishing clubs, fish farms, environmental consulting firms, museums and secondary schools.

Wildlife ecology, aquatic ecology, and vertebrate zoology curriculum options lead to the Bachelor of Science degree. Each student will choose a course of study from among the options within the department’s curricula after consultation with the academic advisor. The chosen option is enhanced by a common departmental “core” of courses necessary for a sound education in the wildlife and fisheries conservation professions.

Students are encouraged to develop an emphasis area within their degree option. To build this emphasis area, students will choose directed electives, from related disciplines, in consultation with their academic advisor and faculty members.

Total Semester Credit Hours: 120

1 Students will complete an internship, study abroad or independent research experience.
2 To be selected from an approved list in consultation with an advisor.
3 The graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a core category, a college/deartment requirement, or a free elective can be used to satisfy this requirement. See academic advisor.
4 Credit by examination may be used to substitute for 3 hours of POLS 206 or POLS 207.
This option (Aquatic Ecology & Conservation Option which is also known as the Fisheries, Aquaculture, and Aquatic Sciences Option) is designed for students interested in the research and management of fish, other freshwater and marine organisms, and the ecosystems that sustain them as well as controlled production of organisms in aquatic systems. Careers are available in state and federal resource agencies; fisheries management companies; nongovernmental conservation organizations; environmental consulting firms; and private consultation. In addition, careers may be available in supporting areas such as quality control, supply, marketing, distribution, finance, consultation as well as domestic and foreign resource development. This degree option can also prepare students for grad school. This option meets American Fisheries Society requirements for certification as an Associate Fisheries Professional.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFSC 444</td>
<td>Aquaculture I: Principles and Practices</td>
<td>4</td>
</tr>
<tr>
<td>WFSC 447</td>
<td>Aquaculture II: Aquatic Animal Nutrition, Feeding</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>and Disease Management</td>
<td></td>
</tr>
<tr>
<td>WFSC 448</td>
<td>Fish Ecophysiology</td>
<td>3</td>
</tr>
<tr>
<td>WFSC 449</td>
<td>Professional Aspects of Aquatic Ecology</td>
<td>3</td>
</tr>
<tr>
<td>WFSC 303</td>
<td>Fish and Wildlife Laws and Administration</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Directed electives</td>
<td>6</td>
</tr>
</tbody>
</table>

**University Core Curriculum**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus or MATH 142 or Business</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
<td>3</td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology—Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>American history electives (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Creative arts elective (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Government/Political science electives (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral science elective (p. 25)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours** 120

1. Students currently enrolled at Texas A&M who wish to transfer to a Wildlife and Fisheries Sciences major must have achieved a grade of C or higher in introductory biology and mathematics courses required in the University Core Curriculum. Enrollment in Wildlife and Fisheries Sciences (WFSC) option courses will be restricted to students who have achieved a grade of C or higher in prerequisite courses.
2. Directed electives to be chosen in areas related to fisheries, aquaculture and related topics.
3. The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement.

Students are required to make a C or better in all WFSC and RENR 205/REN 215 courses.

A total of 120 semester hours will be required for a BS degree.

**Wildlife and Fisheries Sciences - BS, Vertebrate Zoology Option**

Graduates are well equipped for post-baccalaureate study in many life science fields (graduate school programs and human and veterinary medicine) or for direct entry into professions such as wildlife management, fisheries management, environmental impact assessment, aquaculture, natural history museum education, zoological park collection management, public school teaching and urban wildlife management. Employers of recent graduates include state and federal...
resource agencies, scientific foundations, ranches, hunting and fishing clubs, fish farms, environmental consulting firms, museums and secondary schools.

Wildlife ecology, aquatic ecology, and vertebrate zoology curriculum options lead to the Bachelor of Science degree. Each student will choose a course of study from among the options within the department’s curricula after consultation with the academic advisor. The chosen option is enhanced by a common departmental “core” of courses necessary for a sound education in the wildlife and fisheries conservation professions.

Students are encouraged to develop an emphasis area within their degree option. To build this emphasis area, students will choose directed electives, from related disciplines, in consultation with their academic advisor and faculty members.

**Vertebrate Zoology Option**

This emphasis provides the rigorous training needed for careers in the various aspects of natural resources related to the fields of ichthyology, herpetology, mammalogy and ornithology, including behavior, ecology, evolution, genetics, molecular biology, physiology and systematics. It is a flexible program which permits the inclusion of courses specifically required by schools graduate programs as well as schools of dentistry, law, medicine and veterinary medicine.

For students interested in biological diversity and the ecological processes and population interactions that sustain it, courses in this option are designed to provide a strong foundation in basic and applied organismal biology that will prepare students for graduate studies as well as careers within governmental and nongovernmental agencies and environmental firms dealing with biological conservation.

Students who are interested in mathematical and statistical approaches to conservation of endangered species, management of exploited populations, and their habitats will be equipped in basic ecological data analysis and modeling. The demand for professionals who can integrate quantitative methods and ecological concepts is rapidly increasing among government agencies, academia, and the private sector. Possible careers include entry-level assistant positions in fisheries management, wildlife management, environmental consulting, and research at conservation agencies, hospitals, and universities. This is also suitable for students who plan to obtain a post baccalaureate degree (M.S. or PhD) in ecology and related fields later in order to pursue higher level positions.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wildlife and Fisheries Sciences Core Courses</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
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<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<td>&amp; CHEM 111</td>
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<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<td>ENGL 210</td>
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<td>Comprehensive Genetics</td>
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<td>&amp; GENE 312</td>
<td>and Comprehensive Genetics Laboratory</td>
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<td>PHYS 201</td>
<td>College Physics</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<td>STAT 302</td>
<td>Statistical Methods</td>
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<tr>
<td>WFSC 101</td>
<td>Introduction to Wildlife and Fisheries</td>
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<td>WFSC 302</td>
<td>Natural History of the Vertebrates</td>
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<td>WFSC 304</td>
<td>Wildlife and Fisheries Conservation</td>
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<td>WFSC 335</td>
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<td>VTPP 423</td>
<td>Biomedical Physiology I</td>
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<td>BIOL 388</td>
<td>Principles of Animal Physiology</td>
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<td>WFSC 300/ Field Studies</td>
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<td>WFSC 484 Internship</td>
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<td>WFSC 485 Directed Studies</td>
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<td>WFSC 491 Research</td>
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<td><strong>Vertebrate Zoology Option</strong></td>
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<tr>
<td>BICH 303</td>
<td>Elements of Biological Chemistry</td>
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<td>or BICH 410</td>
<td>or Comprehensive Biochemistry I</td>
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<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<td>CHEM 228</td>
<td>Organic Chemistry II</td>
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<td>&amp; CHEM 238</td>
<td>and Organic Chemistry Laboratory</td>
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<td>PHYS 202</td>
<td>College Physics</td>
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<tr>
<td>Biodiversity electives</td>
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<td>Select two of the following:</td>
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<td>WFSC 311 Ichthyology</td>
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<tr>
<td>WFSC 315 Herpetology</td>
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<td>WFSC 401 General Mammalogy</td>
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<td></td>
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<td>WFSC 402 General Ornithology</td>
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<td>ENTO 313 Biology of Insects</td>
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<td>Directed electives&lt;sup&gt;2&lt;/sup&gt;</td>
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<td><strong>University Core Curriculum</strong></td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
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<td>COMM 203</td>
<td>Public Speaking</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
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<tr>
<td>or MATH 142</td>
<td>or Business Calculus</td>
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<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
<td>3</td>
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<td>or MATH 14</td>
<td>or Finite Mathematics</td>
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<tr>
<td>RENR 215</td>
<td>Fundamentals of Ecology—Laboratory</td>
<td>1</td>
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<tr>
<td>American history electives (p. 25)&lt;sup&gt;3&lt;/sup&gt;</td>
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<tr>
<td>Creative arts elective (p. 24)&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>Government/Political science electives (p. 25)</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)&lt;sup&gt;3&lt;/sup&gt;</td>
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<tr>
<td>Social and behavioral science elective (p. 25)&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>Total Semester Credit Hours</td>
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</tbody>
</table>

<sup>1</sup> Texas A&M University Undergraduate Catalog

<sup>2</sup> Texas A&M University Undergraduate Catalog

<sup>3</sup> Texas A&M University Undergraduate Catalog
Students currently enrolled at Texas A&M who wish to transfer to a Wildlife and Fisheries Sciences major must have achieved a grade of C or higher in introductory biology and mathematics courses required in the University Core Curriculum. Enrollment in Wildlife and Fisheries Sciences (WFSC) option courses will be restricted to students who have achieved a grade of C or higher in prerequisite courses.

Directed electives to be chosen to meet prerequisite requirements for admission to professional schools.

The Graduation requirements include a requirement for 6 hours of international and cultural diversity courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. Students are required to make a C or better in all WFSC and RENR 205/RENR 215 courses.

A total of 120 semester hours will be required for a BS degree.

Wildlife and Fisheries Sciences - BS, Wildlife Ecology and Conservation Option

Graduates are well equipped for post-baccalaureate study in many life science fields (graduate school programs and human and veterinary medicine) or for direct entry into professions such as wildlife management, fisheries management, environmental impact assessment, aquaculture, natural history museum education, zoological park collection management, public school teaching and urban wildlife management. Employers of recent graduates include state and federal resource agencies, scientific foundations, ranches, hunting and fishing clubs, fish farms, environmental consulting firms, museums and secondary schools.

Wildlife ecology, aquatic ecology, and vertebrate zoology curriculum options lead to the Bachelor of Science degree. Each student will choose a course of study from among the department’s curricula after consultation with the academic advisor. The chosen option is enhanced by a common departmental “core” of courses necessary for a sound education in the wildlife and fisheries conservation professions.

Students are encouraged to develop an emphasis area within their degree option. To build this emphasis area, students will choose directed electives, from related disciplines, in consultation with their academic advisor and faculty members.

Wildlife Ecology and Conservation Option

This option is designed for students interested in the research, management and conservation of wildlife and its ecosystems. This option provides considerable flexibility when designing a degree program and allows students to focus on both terrestrial and aquatic conservation management. Job opportunities are available with state and federal agencies; private land management individuals and companies; state, national and international organizations; zoos and wildlife centers; environmental consulting firms; and as private consultants. In addition, this degree program can prepare students for further graduate school studies in the wildlife and/or fisheries area. Emphasis areas in this option include:

**Wildlife Ecology Emphasis**

The wildlife ecology emphasis is for students interested in research and management of terrestrial animals and ecosystems, including game, nongame, and endangered species. The ability to be certified is becoming increasingly important for employment. Courses taken can go toward course certification requirements of The Wildlife Society.

**Wildlife and Fisheries Management Emphasis**

This emphasis is for students interested in understanding and management of both aquatic and terrestrial habitats. Courses taken can go toward course certification requirements of both the American Fisheries Society and The Wildlife Society. The ability to be certified is becoming increasingly important for employment.

**Conservation Biology Emphasis**

This emphasis is for students interested in conservation of the earth’s biodiversity. This emphasis allows the student to focus on various ecological environments and socio-economic aspects including urban and/or wetland conservation.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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<td>CHEM 222</td>
<td>Elements of Organic and Biological Chemistry</td>
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<td>CHEM 242</td>
<td>Elementary Organic Chemistry Laboratory</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<td>GENE 301</td>
<td>Comprehensive Genetics and Comprehensive Genetics Laboratory</td>
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<td>&amp; GENE 312</td>
<td>and Comprehensive Genetics Laboratory</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<td>STAT 302</td>
<td>Statistical Methods</td>
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<td>WFSC 101</td>
<td>Introduction to Wildlife and Fisheries</td>
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<td>WFSC 302</td>
<td>Natural History of the Vertebrates</td>
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<td>WFSC 304</td>
<td>Wildlife and Fisheries Conservation</td>
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<tr>
<td>Physiology</td>
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</tr>
</tbody>
</table>

Select one of the following:

WFSC 335 | Natural History of the Invertebrates

BIOL 388 | Principles of Animal Physiology

VTPP 423 | Biomedical Physiology I

Field experience

Select one of the following:

WFSC 300/ Field Studies

ENTO 300

WFSC 484 | Internship

WFSC 485 | Directed Studies

WFSC 491 | Research

Wildlife Ecology and Conservation Option

Biodiversity electives
Select two of the following:
ENTO 313 Biology of Insects
WFSC 315 Herpetology
WFSC 401 General Mammalogy
WFSC 402 General Ornithology

Earth science elective 4
Select one of the following:
SCSC 301 Soil Science
GEOL 101 Principles of Geology
OCNG 251 Oceanography & OCNG 252and Oceanography Laboratory

Policy elective 3
Select one of the following:
WFSC 303 Fish and Wildlife Laws and Administration
RENR 470 Environmental Impact Assessment
RENR 375 Conservation of Natural Resources
ESSM 406 Natural Resources Policy

Directed electives 2

University Core Curriculum
BIOL 111 Introductory Biology I 4
BIOL 112 Introductory Biology II 4
COMM 203 Public Speaking 3
ENGL 104 Composition and Rhetoric 3
MATH 131 Mathematical Concepts—Calculus 3
or MATH 142 or Business Calculus
PHIL 240 Introduction to Logic 3
or MATH 141 or Finite Mathematics
RENR 215 Fundamentals of Ecology—Laboratory 1
American history electives (p. 25) 3 6
Creative arts elective (p. 24) 3 3
Government/POLITICAL science electives (p. 25) 6
Language, philosophy and culture elective (p. 23) 3 3
Social and behavioral science elective (p. 25) 3 3
Total Semester Credit Hours 120

Wildlife and Fisheries Sciences - Minor
The Department of Wildlife and Fisheries Sciences offers an 18-hour minor in Wildlife and Fisheries Sciences as a supplement to other related majors. The minor includes three required courses as well as three additional courses that students can choose from which include courses centered on wildlife management, fisheries management, habitat management, and differences among the different types of wildlife. Students will get an exposure to both terrestrial and aquatic wildlife and habitats. BIOL 111 and BIOL 112 as well as RENR 205 are required prerequisites for several of these courses.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFSC 302</td>
<td>Natural History of the Vertebrates</td>
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<td>WFSC 304</td>
<td>Wildlife and Fisheries Conservation</td>
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<td>WFSC 403</td>
<td>Animal Ecology</td>
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<td>Select one of the following:</td>
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<tr>
<td></td>
<td>WFSC 311 Ichthyology</td>
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<td>WFSC 401 General Mammalogy</td>
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<tr>
<td></td>
<td>WFSC 402 General Ornithology</td>
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<td></td>
<td>WFSC 405 Urban Wildlife and Fisheries</td>
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<td>WFSC 406 Wildlife Habitat Management</td>
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<td>WFSC 410 Principles of Fisheries Management</td>
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<td>WFSC 404 Aquatic Ecosystems</td>
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<td>WFSC 408 Techniques of Wildlife Management</td>
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<td>WFSC 425 Marine Fisheries</td>
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<td>WFSC 444 Aquaculture I: Principles and Practices</td>
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<td>WFSC 447 Aquaculture II: Aquatic Animal Nutrition, Feeding and Disease Management</td>
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<tr>
<td></td>
<td>WFSC 448 Fish Ecophysiology</td>
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</table>

Total Semester Credit Hours 18

1 Aquatic course

Students must choose at least one terrestrial and one aquatic course.

Students are required to make a C or better in all WFSC and RENR 205/RENR 215 courses.

A total of 120 semester hours will be required for a BS degree.
COLLEGE OF ARCHITECTURE

Administrative Officers
Dean - Jorge A. Vanegas, Ph.D.
Executive Associate Dean - Dawn Jourdan, Ph.D.
Associate Dean for Outreach and Diversity - Cecilia Guisti, Ph.D.
Associate Dean for Academic Affairs - Leslie H. Feigenbaum, M.S.
Associate Dean for International Programs - Elton Abbott, D.E.D.

General Statement
The College of Architecture offers undergraduate and graduate professional programs to prepare individuals to enter the professions of architecture, landscape architecture, construction management, urban and regional planning and visualization. The planning, design and construction of the world’s buildings, cities and landscapes involve a variety of professional skills. The faculty of architects, urban planners, landscape architects, engineers, computer scientists, constructors, lawyers, historians and artists, in collaboration with educators in the language, philosophy and culture and natural and social sciences, help students develop an understanding of the physical, social, economic and political forces that shape our environment.

Undergraduate degree programs are offered in landscape architecture, construction science, environmental design architectural studies, visualization and urban and regional planning. Minors in art and architectural history; global art, design and construction; architectural fabrication and product design; and sustainable architecture and planning are offered through the Department of Architecture. A minor in urban and regional planning is offered through the Department of Architecture and Urban Planning. Minors in faculty management; and leadership in the design and construction professions are offered through the Department of Construction Science. Minors in art; and game design and development are offered through the Department of Visualization. Master’s degree programs are offered in architecture, landscape architecture, urban planning, land and property development, construction management, fine arts and visualization. Doctor of Philosophy degrees are offered in architecture and urban and regional sciences.

Personal Computers
Because of the important role of computing in the disciplines housed within the College of Architecture, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Financial aid is available to assist students in their computer purchases. No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Additional information is available on the College of Architecture website or the Department of Visualization website for Visualization students.

Enrollment Management Policy
Students that are admitted into the College of Architecture enter with a lower level classification in Construction Science (p. 218) (COSL), Environmental Design Architectural Studies (p. 212) (EDAL), Landscape Architecture (p. 222) (LANL), Urban and Regional Planning (p. 222) or Visualization (p. 231) (VISL). All students must comply with the guidelines in terms of coursework and process to be considered for upper level. Until students are accepted into upper level they are prohibited from taking 300 and 400 level courses in their major.

Admission will be effective upon successful completion of in-progress courses. If all requirements are not met prior to the start of the following semester, admission will not be granted and registration in all upper level coursework in the College of Architecture will be cancelled. Admission is not guaranteed. If there are more qualified applicants than there is space available, preference will be given to students based on their academic achievement.

Transfer Students
Transfer students, who meet the University entrance requirements and who desire to enter a major field of study in the College of Architecture, will be admitted based on available space and current College of Architecture entrance criteria. Following admission, all transfer students are placed on a 2.5 GPR probation for a minimum of 12 credit hours to substantiate competency in required lower-level courses. Transfer students will be admitted into the college with a lower-level classification and may apply for upper-level status after at least one semester at Texas A&M University.

Transfer students accepted into the Bachelor of Environmental Design degree program must submit a portfolio to the Department of Architecture to receive credit for drawing and design studio classes taken at another university or college, unless the course is listed as an equivalent under the Texas common course numbering system. The review of the portfolio will ensure appropriate studio placement. Additional information may be found on the Department of Architecture website.

Change of Major
Students currently enrolled in another major at Texas A&M University with fewer than 60 hours who desire to change their major field of study into the College of Architecture must fill out a Change of Curriculum application. Deadlines for applications are as follows:

- March 1 for summer admittance (for Construction Science, Environmental Design Architectural Studies, Landscape Architecture, Urban and Regional Planning, Visualization and University Studies students)
- June 15 for fall admittance (for Construction Science, Environmental Design Architectural Studies, Urban and Regional Planning, Visualization and University Studies students)
- October 1 for spring admittance (for Construction Science, Urban and Regional Planning, Visualization and University Studies students)

Students will be notified of action on their applications within 30 days of the deadline date. The college will admit the best-qualified applicants based on the number of spaces available in their program of choice.

Semester Away
The College of Architecture requires all upper-level undergraduate students to spend one semester studying abroad or at another university, or in a professional internship. Specific information on these programs is available through each department or the Texas A&M Study Abroad Office.
Academic Policies

For Construction Science, Environmental Design Architectural Studies, Landscape Architecture, Urban Planning and Visualization

Majors: Students must make a grade of C or better in every College of Architecture course (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, URPN, VIST) used to satisfy degree requirements. Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses that satisfy degree requirements. All majors within the college require student to maintain a 2.0 or better GPR, the College does not offer academic probation.

Majors

College of Architecture
- Bachelor of Science in University Studies, Global Arts, Planning, Design and Construction Concentration (p. 230)

Department of Architecture
- Bachelor of Environmental Design in Environmental Design Architectural Studies (p. 215)

Department of Construction Science
- Bachelor of Science in Construction Science (p. 220)

Department of Landscape Architecture and Urban Planning
- Bachelor of Landscape Architecture and Master of Land and Property Development, 6-Year Degree Program (p. 225)
- Bachelor of Landscape Architecture and Master of Urban Planning, 6-Year Degree Program (p. 226)
- Bachelor of Landscape Architecture in Landscape Architecture (p. 224)
- Bachelor of Science in Urban and Regional Planning (p. 227)
- Bachelor of Science in Urban and Regional Planning and Master of Land and Property Development, 5-Year Degree Program (p. 228)
- Bachelor of Science in Urban and Regional Planning and Master of Urban Planning, 5-Year Degree Program (p. 229)

Department of Visualization
- Bachelor of Science in Visualization (p. 233)

Minors

College of Architecture
- Global Culture and Society Minor (p. 212)

Department of Architecture
- Architectural Fabrication and Product Design Minor (p. 216)
- Architectural Heritage Conservation Minor (p. 216)
- Art and Architectural History Minor (p. 216)
- Global Art, Design and Construction Minor (p. 217)
- Sustainable Architecture and Planning Minor (p. 217)

Department of Construction Science
- Facility Management Minor (p. 221)

Department of Landscape Architecture and Urban Planning
- Urban and Regional Planning Minor (p. 230)

Department of Visualization
- Art Minor, New Media Emphasis or Traditional Media Emphasis (p. 233)
- Game Design and Development Minor (p. 234)

Certificates

College of Architecture
- Diversity Program Certificate (p. 212)

Masters

Department of Architecture
- Master of Architecture in Architecture (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/architecture/march)
- Master of Science in Architecture (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/architecture/ms)

Department of Construction Science
- Master of Science in Construction Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/construction-science/ms)

Department of Landscape Architecture and Urban Planning
- Master of Land and Property Development in Land and Property Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/landscape-architecture-urban-planning/land-property-development-masters)
- Master of Landscape Architecture in Landscape Architecture (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/landscape-architecture-urban-planning/mla)
- Master of Urban Planning in Urban and Regional Planning (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/landscape-architecture-urban-planning/ms-urban-planning)

Department of Visualization
- Master of Fine Arts in Visualization (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/visualization/mfa)
- Master of Science in Visualization (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/architecture/visualization/ms)
Global Culture and Society - Minor

The Global Culture and Society minor will combine a study abroad experience at a single Texas A&M University-affiliated facility abroad with the completion of an interdisciplinary undergraduate minor on a theme appropriate for the center that can be completed in one semester.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portfolio</td>
<td>1</td>
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<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 250</td>
<td>Survey of World Architecture History II</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 210</td>
<td>Social and Cultural Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 202</td>
<td>Geography of the Global Village</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>12</td>
</tr>
<tr>
<td>ARTS 350</td>
<td>The Arts and Civilization</td>
<td>3</td>
</tr>
<tr>
<td>CARC 311</td>
<td>Field Studies in Design Communication</td>
<td>3</td>
</tr>
<tr>
<td>CARC 331</td>
<td>Field Studies in Design Philosophy</td>
<td>3</td>
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<tr>
<td>HIST 362</td>
<td>History of Science</td>
<td>3</td>
</tr>
<tr>
<td>Other Courses approved by student's college</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 16

Students must make a grade of C or better.

1 Portfolio in global culture and society. May be completed either during the long semester abroad or upon return to College Station.

2 Must be taken in a single fall or spring semester at a TAMU-affiliated facility such as Santa Chiara or Soltis Center.

Diversity - Certificate

The Diversity Certificate Program enables students to create, synthesize and integrate academic coursework, co-curricular experience, and service learning engagement to demonstrate their preparedness for participation in the modern global economy and community.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARC 485</td>
<td>Directed Studies</td>
<td>1</td>
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</tbody>
</table>

Department of Architecture

The undergraduate curriculum in Environmental Design Architectural Studies at Texas A&M University is offered through the Department of Architecture. The four-year Bachelor of Environmental Design (BED) degree prepares students for challenging careers in industries supporting the built environments. The program produces graduates who are prepared to influence society with informed and visionary designs—designs that ensure sustainability by responding to cultural, social, economic and ecological factors.

Students interested in professional registration as an architect must complete a National Architectural Accreditation Board (NAAB) accredited Master of Architecture program in addition to the four-year undergraduate Bachelor of Environmental Design degree.

Enrollment in Environmental Design Architectural Studies Upper Level Program

1. Students must have satisfactorily completed at least 54 hours of coursework with a minimum GPR of 2.5 for those courses completed at Texas A&M University.
2. Students must satisfactorily complete the following courses as part of the 54 hours of coursework with a minimum of a 2.5 GPR to apply for upper level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 205</td>
<td>Architecture Design I</td>
<td>4</td>
</tr>
<tr>
<td>ARCH 206</td>
<td>Architecture Design II</td>
<td>5</td>
</tr>
<tr>
<td>or ARCH 212</td>
<td>Architecture Design II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 212</td>
<td>Social and Behavioral Factors in Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 249</td>
<td>Survey of World Architecture History I</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 250</td>
<td>Survey of World Architecture History II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 281</td>
<td>Seminar in Contemporary Architecture</td>
<td>1</td>
</tr>
<tr>
<td>CARC 481</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ENDS 105</td>
<td>Design Foundations I</td>
<td>4</td>
</tr>
<tr>
<td>ENDS 108</td>
<td>Design and Visual Communication Foundations II</td>
<td>5</td>
</tr>
<tr>
<td>ENDS 115</td>
<td>Design Communication Foundations</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following: 6

MATH 141 Finite Mathematics & MATH 144nd Business Calculus
### Preparation for Professional Studies in Architecture

Although the four-year BED degree at Texas A&M University is a pre-professional degree and is not accredited by the National Architectural Accrediting Board (NAAB), those who have completed this pre-professional degree can apply to an accredited Master of Architecture program, which is offered at Texas A&M University.

In the United States, most state architectural registration boards require, as the prerequisites for licensure, a degree from a National Architectural Accrediting Board (NAAB) accredited professional degree program, the fulfillment of the National Council of Architectural Registration Board’s (NCARB) Internship Development Program (IDP), and the successful completion of NCARB’s Architectural Licensing Examination (ARE). The NAAB, which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture (BArch), the Master of Architecture (MArch), and the Doctor of Architecture (DArch). Students should consult the Texas A&M Master of Architecture, NAAB and NCARB websites for additional information.

### Transfer and Change of Major Students

Transfer and change of major students (students currently enrolled in another major at Texas A&M University) who are admitted to the Department of Architecture are classified as lower level (EDAL). Transfer students who meet all the criteria for admittance to upper-level studies may immediately apply for admittance to upper level.

Transfer students who have completed at least 24 graded transferable hours, and change of major students who have completed at least 12 graded transferable hours are encouraged to participate in a 10-week summer module offered by the Department of Architecture. The summer module is designed to provide an intensive first-year design studio sequence along with support coursework that will enable change of major and transfer students to qualify for sophomore design studios the following semester. This summer module can enable Transfer and Change of Major students to complete the four-year degree in a more efficient and timely manner.

Transfer students accepted into the Bachelor of Environmental Design degree program must submit a portfolio to the Department of Architecture to receive credit for drawing and design studio classes taken at another university or college, unless the course is listed as an equivalent under the Texas common course numbering system. The review of the portfolio will ensure appropriate studio placement.

Additional information may be found on the Department of Architecture website.

### Faculty

- **Abbott, Elton D, Associate Professor of the Practice**
  Architecture
  PHD, Texas A&M University, 1983

- **Aitani, Koichiro, Associate Professor**
  Architecture
  MARC, Virginia Polytechnic Institute and State University, 1997

- **Ali, Ahmed K, Associate Professor**
  Architecture
  PHD, Virginia Polytechnic Institute and State University, 2012

- **Babe, John C, Associate Professor of the Practice**
  Architecture
  BAR, University of Toronto, 1989

- **Baltazar, Juan Carlos, Associate Professor**
  Architecture
  PHD, Texas A&M University, 2006

- **Beltran, Liliana O, Associate Professor**
  Architecture
  PHD, University of California, Berkeley, 1997

- **Billingsley, Andrew J, Assistant Lecturer**
  Architecture
  BS, California State University, Chico, 2011

- **Borges Gonzalez, Alejandro, Associate Professor of the Practice**
  Architecture
  MARC, Cornell University, 1994

- **Borhani Haghighi, Alireza, Lecturer**
  Architecture
  MARC, Virginia Polytechnic Institute and State University, 2012

- **Caffey, Stephen M, Instructional Assistant Professor**
  Architecture
  PHD, The University of Texas at Austin, 2008

- **Campagnol Abuabara, Gabriela, Lecturer**
  Architecture
  PHD, University of Sao Paulo - USP, 2008

- **Clayton, Mark J, Professor**
  Architecture
  PHD, Stanford University, 1998

- **Culp, Charles H, Professor**
  Architecture
  PHD, Iowa State University, 1976

- **Deyong, Sarah J, Associate Professor**
  Architecture
  PHD, Princeton University, 2008

- **Erminy Castillo, Marcel, Associate Professor of the Practice**
  Architecture
  PHD, Central University of Venezuela, 1987
Esquivel, Jose G, Associate Professor
Architecture
MA, The Ohio State University, 1998

Geva, Anat M, Professor
Architecture
PHD, Texas A&M University, 1995

Gibbs, Brian C, Visiting Lecturer
Architecture
MARC, Texas A&M University, 2006

Glowacki, Kevin T, Associate Professor
Architecture
PHD, Bryn Mawr College, 1991

Haberl, Jeff, Professor
Architecture
PHD, University of Colorado, 1986

Haliburton, James T, Lecturer
Architecture
MARC, Texas A&M University, 2014

Hamilton, Daniel K, Professor
Architecture
MS, Pepperdine University, 2003

He, Weiling, Associate Professor
Architecture
PHD, Georgia Institute of Technology, 2005

Hill, Rodney C, Professor
Architecture
MA, University of California, Berkeley, 1969

Holliday, Ray W, Assistant Professor of the Practice
Architecture
MLA, Texas A&M University, 2000
MARC, Texas A&M University, 1992

Holliday, Shelley D, Associate Professor of the Practice
Architecture
MEN, Texas A&M University, 2001

Hunter, Christopher S, Assistant Lecturer
Architecture
MS, Texas A&M University, 2015

Jain, Priya, Assistant Professor
Architecture
MARC, University of Arizona, 2007

Kalantar Mehrjardi, Negar, Assistant Professor
Architecture
PHD, Virginia Polytechnic Institute and State University, 2016

Kim, Jong Bum, Assistant Lecturer
Architecture
PHD, Texas A&M University, 2014

Klein, Nancy L, Associate Professor
Architecture
PHD, Bryn Mawr College, 1991

Lu, Zhipeng, Senior Lecturer
Architecture
PHD, Texas A&M University, 2009

Maffei, Gerald L, Visiting Professor
Architecture
MARC, University of California, Berkeley, 1969

Mann, George J, Professor
Architecture
MS, Columbia University, 1962

Miranda, Valerian, Associate Professor
Architecture
PHD, Texas A&M University, 1988

Nichols, Anne B, Associate Professor of the Practice
Architecture
PHD, University of Illinois at Urbana-Champaign, 2000

Obrien, Michael J, Professor
Architecture
MARC, Virginia Polytechnic Institute and State University, 1982

Pentecost, Aubrey R, Professor of the Practice
Architecture
DPH, The University of Texas School of Public Health, 1982

Rodiek, Susan D, Associate Professor
Architecture
PHD, Cardiff University, 2004

Rogers, Julia S, Senior Lecturer
Architecture
PHD, Texas A&M University, 1996

Tabb, Phillip J, Professor
Architecture
PhD, Architectural Association Graduate School of Architecture, 1990

Vanegas, Jorge A, Professor
Architecture
PHD, Stanford University, 1988

Warden, Robert R, Professor
Architecture
MA, University of New Mexico, 1994
MARC, Texas A&M University, 1986

Wells, Ward V, Professor
Architecture
PHD, University of Oklahoma, 1976

Yan, Wei, Professor
Architecture
MA, University of California, Berkeley, 2004

Zhu, Xuemei, Associate Professor
Architecture
PHD, Texas A&M University, 2008

**Majors**

- Bachelor of Environmental Design in Environmental Design
  Architectural Studies (p. 215)
Minors

• Architectural Fabrication and Product Design Minor (p. 216)
• Architectural Heritage Conservation Minor (p. 216)
• Art and Architectural History Minor (p. 216)
• Global Art, Design and Construction Minor (p. 217)
• Sustainable Architecture and Planning Minor (p. 217)

Environmental Design Architectural Studies - BED

The degree in Environmental Design Architectural Studies requires study in the arts, humanities and sciences. The curriculum fosters creativity and problem-solving skills while providing a solid foundation in design, theory, architectural history, building and technology. Coursework encourages multidisciplinary and comparative perspectives that allow opportunities for communication and team-oriented methods of production. Global perspectives are encouraged by a mandatory semester-long study away experience that includes study abroad or internship opportunities.

Students develop skills and acquire knowledge through a studio-based experience with a variety of proposed or actual design-related projects. The studio projects place a shared emphasis on the technical and expressive content of design work; the processes by which student’s research, synthesize and document their design ideas; and the creation of tangible products that achieve a high quality of graphic and physical craft.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Environmental Design Architectural Studies</td>
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<tr>
<td></td>
<td>Curriculum</td>
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<td>ARCH 205</td>
<td>Architecture Design I</td>
<td>4</td>
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<tr>
<td>ARCH 206</td>
<td>Architecture Design II</td>
<td>5</td>
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<tr>
<td>or ARCH 207 or Architecture Design II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARCH 249</td>
<td>Survey of World Architecture History 1</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 305</td>
<td>Architectural Design III</td>
<td>5</td>
</tr>
<tr>
<td>ARCH 330</td>
<td>The Making of Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 331</td>
<td>Architectural Structures</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 335</td>
<td>Architectural Systems</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 350</td>
<td>History and Theory of Modern and Contemporary Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 405</td>
<td>Architectural Design IV</td>
<td>5</td>
</tr>
<tr>
<td>ARCH 406</td>
<td>Architecture Design V</td>
<td>5</td>
</tr>
<tr>
<td>ARCH 431</td>
<td>Integrated Structures</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 435</td>
<td>Integrated Systems</td>
<td>2</td>
</tr>
<tr>
<td>ENDS 105</td>
<td>Design Foundations I</td>
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</tr>
<tr>
<td>ENDS 108</td>
<td>Design and Visual Communication Foundations II</td>
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<tr>
<td>ENDS 115</td>
<td>Design Communication Foundations</td>
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</tr>
<tr>
<td>CARC 481</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>Study Away</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Select one of the following:

Option 1:
- CARC 301 Field Studies in Design Innovation
- Study Away elective
- Study Away elective

Option 2:
- ARCH 494 Internship
- Study Away elective

ARCH 281 Seminar in Contemporary Architecture

Directed electives 6

General elective 3

University Core Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 212</td>
<td>Social and Behavioral Factors in Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 213</td>
<td>Sustainable Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 250</td>
<td>Survey of World Architecture History II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Communication (p. 22)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 15</td>
<td>Engineering Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 151</td>
<td>Engineering Mathematics I</td>
<td>3</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
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<td>5</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 120

1 Study Away electives will be selected with approval of the Assistant Dean for International Programs & Initiatives.
2 Directed Electives are to be selected from an approved list; see the Department of Architecture Undergraduate Advisor (in Langford ARCA 219).
3 Select from any 100-499 course not used elsewhere (except MATH 100-MATH 103 (p. 885) and MATH 150).
4 Except PHYS 201.
5 Courses pertaining to solely Texas history may not comprise more than 3 hours of the American History core curriculum requirement.

All proposals for undergraduate independent study must be signed by the supervising faculty and submitted to the department for approval; forms are available from the Department of Architecture Undergraduate Advisor (in Langford ARCA 219) and on the department website.

A grade of C or better must be made in all College of Architecture courses (ARCH, ARTS, COSC, CARC, ENDS, LAND, LDEV, URPN, and VIST).

Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses satisfying degree requirements.
Architectural Fabrication and Product Design - Minor

The minor in Architectural Fabrication and Product Design can serve as a complement to several major fields of study and is open to all Texas A&M University undergraduates. The structure of the minor encourages students to gain a broad understanding of the terminology, history, prototyping and professional practices in Architectural Fabrication and Product Design. The minor includes six (6) credit hours of foundation coursework and nine (9) credit hours of design, theory and practice coursework.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENDS 101</td>
<td>Design Process</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 216</td>
<td>Computational Methods in Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 353</td>
<td>History of Product Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 381</td>
<td>Design Seminar ¹</td>
<td>1</td>
</tr>
<tr>
<td>ARCH 317</td>
<td>Digital Fabrication for Architecture</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

¹ This is a 1 credit hour course that must be taken three times for a total of 3 credits.

Must make a grade of 'C' or better in all courses.

Architectural Heritage Conservation - Minor

Overview

The College of Architecture offers an Architectural Heritage Conservation Minor.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 246</td>
<td>Foundations of Historic Preservation</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 346</td>
<td>Architecture, Heritage and Culture</td>
<td>3</td>
</tr>
<tr>
<td>Total Architectural History</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 350</td>
<td>History and Theory of Modern and Contemporary Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 430</td>
<td>History of Ancient Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 434</td>
<td>The Role of Sculpture and Painting in Ancient Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 438</td>
<td>History and Design of Sacred Architecture</td>
<td>3</td>
</tr>
<tr>
<td>Electives ¹</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ANTH 202</td>
<td>Introduction to Archaeology</td>
<td></td>
</tr>
<tr>
<td>ANTH 313</td>
<td>Historical Archaeology</td>
<td></td>
</tr>
</tbody>
</table>

¹ Eligible undergraduate students meeting prerequisite requirements may enroll in the ARCH 648.

Students must complete a minimum of 6 hours in residence at the 300-400 level.

Students applying for a minor in Architectural Heritage Conservation must have a 2.0 or better overall GPR. Some colleges and departments outside the College of Architecture may permit their students to minor.

Students must obtain a C or better in each course listed above (or in any transfer course used as an equivalent).

Art and Architecture History - Minor

The Minor in Art and Architecture History provides undergraduate students with an interdisciplinary, global, and multicultural approach to understanding visual arts and the built environment. The curriculum emphasizes an awareness of diverse global cultures and historical traditions, an appreciation of context, visual understanding, and critical thinking. The Minor in Art and Architecture History can serve as a complement to several major fields of study and is open to all Texas A&M undergraduates. The structure of the minor encourages students to gain a broad chronological understanding of art and architectural history before advancing to specialized areas of interest. Coursework includes six credit hours at the introductory level (100- and 200-level courses) and nine credit hours in specialized subjects at an advanced level (300- and 400-level courses) for a total of 15 credit hours.

The application form can be found on the Department of Architecture's website. Per university guidelines, the student's home college/department is responsible for advising students pursuing the Minor in Art and Architecture History.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTS 149</td>
<td>Art History Survey I</td>
<td>3</td>
</tr>
<tr>
<td>or ARCH 249</td>
<td>or Survey of World Architecture History I</td>
<td></td>
</tr>
<tr>
<td>ARTS 150</td>
<td>Art History Survey II</td>
<td>3</td>
</tr>
<tr>
<td>or ARCH 25</td>
<td>or Survey of World Architecture History II</td>
<td></td>
</tr>
</tbody>
</table>
Select nine hours from the following:

ANTH 353/ CLAS 353 Archaeology of Ancient Greece
ANTH 354/ CLAS 354 Archaeology of Ancient Italy
ARCH 345 History of Building Technology
ARCH 350 History and Theory of Modern and Contemporary Architecture
ARCH 430 History of Ancient Architecture
ARCH 434 The Role of Sculpture and Painting in Ancient Architecture
ARCH 437 Great Medieval Cathedrals
ARCH 438 History and Design of Sacred Architecture
ARCH 441 Baroque and Rococo Architecture
ARCH 443 Aegean Art and Architecture
ARCH 489 Special Topics in... & ARTS 489 Special Topics in... (Art and Architectural History)
ARTS 330 The Arts of America
ARTS 349 The History of Modern Art
ARTS 350 The Arts and Civilization
CLAS 353/ ANTH 353 Archaeology of Ancient Greece
CLAS 354/ ANTH 354 Archaeology of Ancient Italy

Total Semester Credit Hours 15

1 Coordination with Bachelor of Environmental Design (BED) Degree Plan - For students pursuing the BED degree, upper level coursework for the minor may be applied to general or free electives, but may not be applied to directed electives or any other requirements for BED degree plan.

2 Coordination with University Studies Architecture (USAR) Degree Plan - Students pursuing the University Studies Architecture degree cannot use a course in the concentration area for the Art and Architectural History Minor or the second minor, and no courses taken within the AAH Minor can count toward the concentration or the second minor. Courses that count toward University Core Curriculum can count for both the AAH minor and that specific core requirement.

3 Students must complete a minimum of 6 hours in residence at the 300-400 level.

Global Art Design and Construction - Minor

The Minor in Global Art, Design and Construction is designed for students in the College of Architecture and other colleges to officially record they have taken courses in an international environment.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select six hours from the following:</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ARCH 249</td>
<td>Survey of World Architecture History I</td>
<td></td>
</tr>
<tr>
<td>ARCH 250</td>
<td>Survey of World Architecture History II</td>
<td></td>
</tr>
<tr>
<td>ARCH 345</td>
<td>History of Building Technology</td>
<td></td>
</tr>
<tr>
<td>ARCH 350</td>
<td>History and Theory of Modern and Contemporary Architecture</td>
<td></td>
</tr>
<tr>
<td>ARTS 149</td>
<td>Art History Survey I</td>
<td></td>
</tr>
<tr>
<td>ARTS 150</td>
<td>Art History Survey II</td>
<td></td>
</tr>
<tr>
<td>LAND 240</td>
<td>History of Landscape Architecture</td>
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</table>

Select six hours from the following: 6

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ARCH 345</td>
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</tr>
<tr>
<td>ARCH 430</td>
<td>History of Ancient Architecture</td>
<td></td>
</tr>
<tr>
<td>ARCH 434</td>
<td>The Role of Sculpture and Painting in Ancient Architecture</td>
<td></td>
</tr>
<tr>
<td>ARCH 437</td>
<td>Great Medieval Cathedrals</td>
<td></td>
</tr>
<tr>
<td>ARCH 441</td>
<td>Baroque and Rococo Architecture</td>
<td></td>
</tr>
<tr>
<td>ARTS 329</td>
<td>Texas Art History</td>
<td></td>
</tr>
<tr>
<td>ARTS 330</td>
<td>The Arts of America</td>
<td></td>
</tr>
<tr>
<td>ARTS 335</td>
<td>The Art and Architecture of Rome</td>
<td></td>
</tr>
<tr>
<td>ARTS 349</td>
<td>The History of Modern Art</td>
<td></td>
</tr>
<tr>
<td>ARTS 445</td>
<td>Byzantine Art and Architecture</td>
<td></td>
</tr>
<tr>
<td>LAND 241</td>
<td>History and Development of Landscape Architecture in North America</td>
<td></td>
</tr>
<tr>
<td>URPN 460</td>
<td>Sustainable Communities</td>
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International Component

Select six hours from the following: 6

<table>
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<tr>
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</tr>
<tr>
<td>ARCH 494</td>
<td>Internship 1</td>
<td></td>
</tr>
<tr>
<td>ARTS 212</td>
<td>Life Drawing 2</td>
<td></td>
</tr>
<tr>
<td>ARTS 305</td>
<td>Painting 2</td>
<td></td>
</tr>
<tr>
<td>ARTS 308</td>
<td>Sculpture 2</td>
<td></td>
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<tr>
<td>ARTS 311</td>
<td>Black and White Photography 2</td>
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<tr>
<td>ARTS 312</td>
<td>Advanced Photography 2</td>
<td></td>
</tr>
<tr>
<td>ARTS 350</td>
<td>The Arts and Civilization 2</td>
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</tr>
<tr>
<td>CARC 301</td>
<td>Field Studies in Design Innovation 2</td>
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<tr>
<td>CARC 311</td>
<td>Field Studies in Design Communication 2</td>
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<tr>
<td>CARC 331</td>
<td>Field Studies in Design Philosophy 2</td>
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<tr>
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<td>Internship - 10 Week 1</td>
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</tr>
<tr>
<td>COSC 494</td>
<td>Internship 1</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 18

1 Must be taken as international internship.
2 Must be taken as international studio.

Students must make a grade of C or better.

Sustainable Architecture and Planning - Minor

The Minor in Sustainable Architecture and Planning (SARP) provides undergraduate students with a multidisciplinary approach to understanding sustainability of the built environment. The curriculum

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
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<table>
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<tbody>
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<tr>
<td>ARTS 330</td>
<td>The Arts of America</td>
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<td>Sustainable Communities</td>
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International Component

Select six hours from the following: 6

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<td></td>
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<tr>
<td>COSC 484</td>
<td>Internship - 10 Week 1</td>
<td></td>
</tr>
<tr>
<td>COSC 494</td>
<td>Internship 1</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

1 Must be taken as international internship.
2 Must be taken as international studio.

Students must make a grade of C or better.
emphasizes an awareness of responsible practices at a variety of scales impacting the built environment: buildings, communities, architectural systems, global resource management, and social equity. Students will become aware of responsible architectural design and develop critical thinking skills to address the multifaceted issues facing the profession today.

The Minor in Sustainable Architecture and Planning can serve as a complement to several major fields of study and is open to all Texas A&M undergraduates. The structure of the minor encourages students to gain a broad understanding before advancing to specialized areas of interest. Coursework includes six credit hours at the introductory level (100- and 200-level courses) and nine credit hours in specialized subjects, three of which must be at an advanced level (300- and 400-level courses) for a minimum total of 15 credit hours. Per University guidelines, the student's home college/department is responsible for advising students pursuing the Minor in Sustainable Architecture and Planning.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 213</td>
<td>Sustainable Architecture</td>
<td>3</td>
</tr>
<tr>
<td>URPN 460</td>
<td>Sustainable Communities</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select three courses from the following:</td>
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<tr>
<td>ARCH 246</td>
<td>Foundations of Historic Preservation</td>
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</tr>
<tr>
<td>ARCH 421</td>
<td>Energy and Sustainable Architecture</td>
<td></td>
</tr>
<tr>
<td>ENGR 101</td>
<td>Energy: Resources, Utilization and Importance to Society</td>
<td></td>
</tr>
<tr>
<td>GEOG 202</td>
<td>Geography of the Global Village</td>
<td></td>
</tr>
<tr>
<td>GEOG 306</td>
<td>Introduction to Urban Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 330</td>
<td>Resources and the Environment</td>
<td></td>
</tr>
<tr>
<td>PHIL 205</td>
<td>Technology and Human Values</td>
<td></td>
</tr>
<tr>
<td>URPN 202</td>
<td>Building Better Cities</td>
<td></td>
</tr>
<tr>
<td>URPN 361</td>
<td>Urban Issues</td>
<td></td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours**

1. At least three of the nine hours must be at the 300-400 level. Six of the nine hours may be in coursework taken outside of the College of Architecture.
2. BED majors may not use directed electives to satisfy both the minor and graduation requirements. USAR majors may not use coursework to satisfy both the minor and the concentration area.
3. Students must complete a minimum of 6 hours in residence at the 300-400 level.

Students must make a grade of "C" or better in all courses.

**Department of Construction Science**

The primary mission of the Department of Construction Science is to prepare students for successful careers and future leadership roles in construction and construction-related industries. The program integrates principles of architecture, technology, engineering, business and project management preparing students to effectively manage the total construction process. Courses taught by the Department include construction materials and methods, fundamental design courses in soils and foundations, mechanical and electrical systems and structures, project control systems and management, construction law, labor and contracts, and industry emphasis courses. In addition, related courses from other colleges are included to ensure a broad base of knowledge in business, engineering and construction fundamentals.

**Enrollment in Construction Science Program**

1. Students must have satisfactorily completed at least 54 hours of coursework with a minimum GPR of 2.5 for those courses completed at Texas A&M University.
2. Students must satisfactorily complete the following courses as part of the 54 hours of coursework with a minimum of a 2.5 GPR to be considered to upper level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Construction Science</td>
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</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>or GEOL 10</td>
<td>or Principles of Geology</td>
<td></td>
</tr>
<tr>
<td>or ENGR 10</td>
<td>or Energy: Resources, Utilization and Importance to Society</td>
<td></td>
</tr>
<tr>
<td>COSC 175</td>
<td>Construction Graphics Communication</td>
<td>3</td>
</tr>
<tr>
<td>COSC 253</td>
<td>Construction Materials and Methods I</td>
<td>3</td>
</tr>
<tr>
<td>COSC 254</td>
<td>Construction Materials and Methods II</td>
<td>3</td>
</tr>
<tr>
<td>COSC 275</td>
<td>Estimating I</td>
<td>3</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 2</td>
<td>or Public Speaking</td>
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</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
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<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
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</table>

**Total Semester Credit Hours**

3. Students must apply for upper level through the department. The application is to be submitted the semester or summer session in which all of the above criteria are met.

- March 1 for Summer admission
- June 15 for Fall admission
- October 1 for Spring admission
Faculty

Ashburn, Benjamin S, Instructional Assistant Professor
Construction Science
MBA, Webster University, 2009

Bae, Junseo, Visiting Lecturer
Construction Science
MARC, Hanyang University, South Korea, 2011

Benham, James M, Visiting Lecturer
Construction Science
MS, Texas A&M University, 2014

Bigelow, Ben F, Assistant Professor
Construction Science
PHD, University of Colorado, 2014
MLA, Arizona State University, 2008

Boldt, Gary L, Senior Lecturer
Construction Science
BS, Texas A&M University, 1983

Bryant, John A, Associate Professor
Construction Science
PHD, Texas A&M University, 1995

Carlson, Kimberly A, Senior Lecturer
Construction Science
MARC, Texas A&M University, 2002

Choi, Kunhee, Associate Professor
Construction Science
PHD, University of California, Berkeley, 2008

Choudhury, Iftekharudd, Associate Professor
Construction Science
PHD, Texas A&M University, 1994

Daigneault, Melissa S, Visiting Lecturer
Construction Science
JD, Wake Forest University School of Law, 2003

Dixit, Manish K, Assistant Professor
Construction Science
PHD, Texas A&M University, 2013

Du, Jing, Assistant Professor
Construction Science
PHD, Michigan State University, 2012

Ellis, Debra R, Senior Lecturer
Construction Science
JD, Baylor University, 1993

Escamilla, Edelmiro E, Instructional Assistant Professor
Construction Science
PHD, Texas A&M University, 2011
MAR, Texas A&M University, 2002

Feigenbaum, Leslie H, Senior Lecturer
Construction Science
MS, Texas A&M University, 1985

Fernandez-Solis, Jose L, Associate Professor
Construction Science
PHD, Georgia Institute of Technology, 2006

Fickel, Larry W, Senior Lecturer
Construction Science
BS, Texas A&M University, 1981

Grisham, Ray F, Lecturer
Construction Science
JD, The University of Texas at Austin, 1972

Haque, Mohammed E, Professor
Construction Science
PHD, New Jersey Institute of Technology, 1995

Horlen, Joseph P, Associate Professor
Construction Science
JD, Baylor University, 1980

Jordan, Michael P, Lecturer
Construction Science
BS, Texas A&M University, 1997

Kang, Ho-Yeong, Associate Professor
Construction Science
PHD, Texas A&M University, 2001

Lavy, Sarel, Associate Professor
Construction Science
PHD, Technion - Israel Institute of Technology, 2006

Lavaro, Anthony R, Senior Lecturer
Construction Science
MS, Texas A&M University, 1976

McGowan, Anne B, Instructional Professor
Construction Science
MS, Texas A&M University, 1997

Nichols, John M, Associate Professor
Construction Science
PHD, University of Newcastle, Australia, 2002

Rybkowski, Zofia K, Associate Professor
Construction Science
PHD, University of California, Berkeley, 2009

Rodgers, William S, Clinical Professor
Construction Science
JD, Texas Tech University, 1978

Ryoo, Boong Y, Associate Professor
Construction Science
PHD, University of Wisconsin - Madison, 1995

Whitman, John M, Visiting Lecturer
Construction Science
BS, Texas A&M University, 1989
Williamson, Kenneth C, Associate Professor
Construction Science
PHD, University of Oklahoma, 1994

Workman, Ronald L, Senior Lecturer
Construction Science
MS, Texas A&M University, 2002

Majors
• Bachelor of Science in Construction Science (p. 220)

Minors
• Facility Management Minor (p. 221)
• Leadership in the Design and Construction Professions Minor (p. 221)

Construction Science - BS

The Construction Science Program is accredited by the American Council for Construction Education. Strong ties are maintained with the construction industry via the Construction Industry Advisory Council, an organization of construction and construction-related companies and individuals committed to supporting the Construction Science Program at Texas A&M University.

Because of the important role of computing in the disciplines housed within the College of Architecture, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Financial aid is available to assist students in their computer purchases. No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Additional information is available on the College of Architecture website.

In addition to the academic coursework, each student is required to accomplish an approved internship of full-time practical work experience with a contractor, or in a construction-related work activity. For more information, please visit the Department of Construction Science website.

Program Requirements

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<tr>
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<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
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<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
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<tr>
<td>FINC 409</td>
<td>Survey of Finance Principles</td>
<td>3</td>
</tr>
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<td>MGMT 209</td>
<td>Business, Government and Society</td>
<td>3</td>
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<td>MGMT 309</td>
<td>Survey of Management</td>
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<td>MKTG 409</td>
<td>Principles of Marketing</td>
<td>3</td>
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<td>COSC 175</td>
<td>Construction Graphics Communication</td>
<td>3</td>
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<td>Construction Surveying</td>
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<td>COSC 321</td>
<td>Structural Systems I</td>
<td>3</td>
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<td>COSC 325</td>
<td>Mechanical, Electrical and Plumbing Systems in Construction I</td>
<td>3</td>
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<tr>
<td>COSC 326</td>
<td>Mechanical, Electrical and Plumbing Systems in Construction II</td>
<td>3</td>
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<td>COSC 421</td>
<td>Soil and Structural Analysis.</td>
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<td>COSC 275</td>
<td>Estimating I</td>
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<tr>
<td>COSC 353</td>
<td>Construction Project Management</td>
<td>3</td>
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<tr>
<td>COSC 364</td>
<td>Construction Safety I</td>
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<tr>
<td>COSC 375</td>
<td>Estimating II</td>
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<td>COSC 381</td>
<td>Professional Ethics in the Construction Industry</td>
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<td>COSC 463</td>
<td>Introduction to Construction Law</td>
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<td>COSC 465</td>
<td>Advanced Topics in Construction Law</td>
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<td>COSC 475</td>
<td>Construction Project Planning</td>
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<td>Construction Project Controls</td>
<td>3</td>
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<tr>
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<td>Residential Capstone</td>
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<td>Commercial Capstone</td>
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<td>COSC 443</td>
<td>Industrial Capstone</td>
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<td>COSC 446</td>
<td>Specialty Capstone</td>
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<td>COSC 450</td>
<td>Facility Management Principles and Practices</td>
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<td>COSC 459</td>
<td>Industrial Construction</td>
<td>3</td>
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<td>COSC 461</td>
<td>Building Information Modeling System</td>
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<td>COSC 464</td>
<td>Construction Safety II</td>
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<tr>
<td>COSC 491</td>
<td>Research</td>
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</table>

Approved study abroad course

Mathematics
MATH 141 Finite Mathematics   3
MATH 142 Business Calculus    3

Life and physical sciences
PHYS 201 College Physics      4

Select one of the following:  4

CHEM 101 Fundamentals of Chemistry I
& CHEM 11 Fundamentals of Chemistry Laboratory I

GEOL 101 Principles of Geology

Life and physical sciences (p. 22)  1

General Education

COMM 203 Public Speaking      3
ENGL 104 Composition and Rhetoric  3
ENGL 210 Technical and Business Writing  3
POLS 206 American National Government  3
POLS 207 State and Local Government  3
Facility Management - Minor

The Department of Construction Science offers a minor in Facility Management. This minor will encompass multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>COSC 450</td>
<td>Facility Management Principles and Practices</td>
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<td>COSC 474</td>
<td>Facility Management Internship</td>
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</table>

Select one of the following:

- ACCT 209 Survey of Accounting Principles
- ACCT 210 Survey of Managerial and Cost Accounting Principles
- AGEC 422 Land Economics
- FINC 409 Survey of Finance Principles
- URPN 440 Urban and Regional Economic Development

Select one of the following:

- ARCH 458 Cultural and Ethical Considerations for Global Practice
- COMM 205 Communication for Technical Professions
- COMM 315 Interpersonal Communication
- COMM 324 Communication Leadership and Conflict Management
- COSC 333 Project Management for Facility Managers
- COSC 353 Construction Project Management
- MGMT 309 Survey of Management
- URPN 440 Urban and Regional Economic Development

Leadership in the Design and Construction Professions - Minor

The Department of Construction Science offers a minor in Leadership in the Design and Construction Professions. This minor will enhance the leadership skills of students by educating them about different leadership techniques and skills that will help them grow personally in order to become effective leaders in the design and construction industries.

**Program Requirements**

<table>
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<th>Title</th>
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<td>COSC 310</td>
<td>Design and Construction Leadership Education I</td>
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<td>COSC 410</td>
<td>Design and Construction Leadership Education II</td>
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<tr>
<td>COSC 411</td>
<td>Seminar in Design and Construction Executive Leadership</td>
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Select from:

- COSC 333 Project Management for Facility Managers
- COSC 353 Construction Project Management
- COSC 463 Introduction to Construction Law
- COSC 465 Advanced Topics in Construction Law
- COSC 475 Construction Project Planning
- COSC 440 Interdisciplinary Capstone
- COSC 441 Residential Capstone
- COSC 442 Commercial Capstone
- COSC 443 Industrial Capstone
- COSC 446 Specialty Capstone
- ARCH 305 Architectural Design III
- ARCH 405 Architectural Design IV
- ARCH 406 Architecture Design V
- ARCH 451 Strategies in Architectural Management
- ARCH 457 Ethics and Professional Practice
**Department of Landscape Architecture and Urban Planning**

**Landscape Architecture**

Landscape architecture is the profession providing landscape planning, design, and management services to enhance and protect natural and built environments. Landscape architecture as a discipline is devoted to understanding and managing the human and environmental forces that change the landscape. Landscape architects plan and design places for the health, safety, and welfare of citizens through systematic decision-making that integrates science, art, and technology. Individual and community quality of life are enhanced by a design process to improve, protect, and create ecologically sustainable, socially equitable, and economically feasible landscapes. Landscape architects work in urban, suburban and wilderness environments. Our graduates have gained distinction for projects as varied in scale as private gardens, residential communities, urban plazas, college campuses, park facilities and regional conservation plans.

The Bachelor in Landscape Architecture (BLA) program is nationally accredited as a professional degree program. The mission of the program is to prepare students to become professional landscape architects in private and public sector practice. Our educational goal is to produce graduates motivated to be leaders in the field and professionals who are intellectually active, broadly-educated citizens and life-long learners.

**Urban and Regional Planning**

The Bachelor of Science in Urban and Regional Planning degree program emphasizes the social, economic, cultural and natural factors that govern how communities and society are shaped. Coursework provides students with the knowledge and skills needed to develop solutions to community and regional growth and development issues that face our state and nation. Students have an opportunity to specialize in specific aspects of community and regional planning and development issues along with internship and service-learning experiences locally, nationally, and/or internationally.

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**Enrollment in Landscape Architecture and Urban and Regional Planning Programs**

1. Students must have satisfactorily completed at least 54 hours of coursework with a minimum GPR of 2.5 for those courses completed at Texas A&M University to apply for upper level.
2. Students must satisfactorily complete the courses listed below as part of the 54 hours of coursework with a minimum of a 2.5 GPR to be considered for upper level.
3. Student must apply to the upper level through the department. The application is to be submitted the semester or summer session in which all of the above criteria are met.

- March 1 for Summer admission
- June 15 for Fall admission
- October 1 for Spring admission

**Landscape Architecture**

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<td>LAND 101</td>
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<td>LAND 111</td>
<td>Landscape Architecture Communications I</td>
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<td>LAND 112</td>
<td>Landscape Architectural Communications II</td>
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<td>LAND 231</td>
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<td>LAND 240</td>
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<td>RENR 205</td>
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**Urban and Regional Planning**

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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>RENR 205</td>
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<td>RENR 375</td>
<td>Conservation of Natural Resources</td>
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</table>
URPN 200  Introduction to Landscape Architectural Practice  1
URPN 201  The Evolving City  3
URPN 202  Building Better Cities  3
URPN 210  Urban Analytical Methods I  3
URPN 220  Digital Communication I  3
URPN 325  Introduction to GIS in Urban and Regional Planning  3

Total Semester Credit Hours  45

Faculty

Anderson, Sammy K, Executive Associate Professor
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 1993

Bardenhagen, Eric K, Assistant Professor
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 2011
MLA, Texas A&M University, 1999

Berke, Philip R, Professor
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 1981

Booth, Geoffrey J, Associate Professor
Landscape Architecture & Urban Planning
MA, University of Queensland, 1987

Brody, Samuel, Professor
Landscape Architecture & Urban Planning
PHD, University of North Carolina at Chapel Hill, 2002

Brown, Robert D, Professor
Landscape Architecture & Urban Planning
PHD, University of Guelph, 1985
MLA, University of Guelph, 1982

Cooper, John T, Associate Professor of the Practice
Landscape Architecture & Urban Planning
PHD, University of North Carolina at Chapel Hill, 2004
MUP, Texas A&M University, 1994

Cowell, Robert S, Visiting Assistant Professor
Landscape Architecture & Urban Planning
MA, University of Tennessee, 1999

Dvorak, Bruce D, Associate Professor
Landscape Architecture & Urban Planning
MLA, University of Illinois at Urbana-Champaign, 1994

Giusti, Cecilia H, Associate Professor
Landscape Architecture & Urban Planning
PHD, The University of Texas at Austin, 2001

Huang, Chang S, Associate Professor
Landscape Architecture & Urban Planning
PHD, University of Pennsylvania, 1995
MLA, Pennsylvania State University, 1992

Hurst, Kenneth R, Assistant Lecturer
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 2016
MLA, University of Oklahoma, 1988

Jourdan, Dawn E, Professor
Landscape Architecture & Urban Planning
PHD, Florida State University, 2004
MUP, University of Kansas, 2000
JD, University of Kansas, 2000

Kim, Bo Ah, Assistant Lecturer
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 2016
MUP, Texas A&M University, 2009

Kim, Hyun Woo, Lecturer
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 2015

Lee, Chanam, Professor
Landscape Architecture & Urban Planning
PHD, University of Washington, 2004
MLA, Texas A&M University, 1999

Li, Ming-Han, Professor
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 2002
MLA, Texas A&M University, 1998

Li, Wei, Assistant Professor
Landscape Architecture & Urban Planning
MLA, University of California, Irvine, 2011

Lorente, Paula, Assistant Lecturer
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 2016
MUP, Texas A&M University, 2005

Martin, June C, Instructional Associate Professor
Landscape Architecture & Urban Planning
MS, University of Georgia, 2002
MPA, University of Georgia, 1991

Merrill, Jeremy, Assistant Professor
Landscape Architecture & Urban Planning
PHD, Kansas State University, 2014
MLA, Kansas State University, 2009

Mickelson, Kimberley, Visiting Associate Professor
Landscape Architecture & Urban Planning
MPA, The University of Texas at Austin, 1986
JD, The University of Texas School of Law, 1986

Ndubisi, Forster O, Professor
Landscape Architecture & Urban Planning
PHD, University of Waterloo, Canada, 1987

Newman, Galen D, Associate Professor
Landscape Architecture & Urban Planning
PHD, Clemson University, 2010
MLA, Auburn University, 2006
Majors

- Bachelor of Landscape Architecture and Master of Land and Property Development, 6-Year Degree Program (p. 225)
- Bachelor of Landscape Architecture in Landscape Architecture (p. 224)
- Bachelor of Science in Urban and Regional Planning (p. 227)
- Bachelor of Science in Urban and Regional Planning and Master of Land and Property Development, 5-Year Degree Program (p. 228)
- Bachelor of Science in Urban and Regional Planning and Master of Urban Planning, 5-Year Degree Program (p. 229)

Minors

- Urban and Regional Planning Minor (p. 230)

Landscape Architecture - BLA

The mission of the Bachelor of Landscape Architecture (BLA) program is to prepare students to become professional landscape architects in the private and public sectors of practice. We foster a learning environment of creativity and critical analysis that uses evidence-based design principles as its core. This approach builds upon the knowledge of natural and built environments and how humans interact within various cultural settings. Our BLA graduates use this knowledge to produce spatial solutions at multiple scales from site design to land use planning. This creative process aims to advance human health, and social, economic and environmental sustainability. The program strives to produce graduates motivated to be life-long learners capable of working independently and leading interdisciplinary teams in the field of landscape architecture.

Graduates from the BLA program are prepared for employment with private practice firms in landscape architecture, engineering, architecture, or planning; and with federal, state, or local government agencies. Upon graduation and with additional two-year practical experience students are qualified to pursue licensure in the profession or post graduate education in landscape architecture or a related field.

Because of the important role of computing in the disciplines housed within the College of Architecture, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program. Financial aid is available to assist students in their computer purchases. No student will be denied admission to Texas A&M University based on an inability to purchase a computer. Additional information is available on the Department of Landscape Architecture and Urban Planning website.

Program Requirements

First Year

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<th>Fall</th>
<th>Semester Credit Hours</th>
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<td>ENGL 104 Composition and Rhetoric</td>
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<td>LAND 101 Introduction to Landscape Architectural Practice</td>
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<td>LAND 111 Landscape Architecture Communications I</td>
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<td>MATH 141 Finite Mathematics</td>
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<td>URPN 220 Digital Communication I</td>
<td>3</td>
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<td>American history (p. 25)</td>
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</table>

Semester Credit Hours 16
## Landscape Architecture - 6-Year Bachelor of Landscape Architecture/Master of Land and Property Development

The Department of Landscape Architecture and Urban Planning offers a 6-year Bachelor of Landscape Architecture and Master of Land and Property Development degree program.

### Program Requirements

#### First Year

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<th>Term</th>
<th>Course Code</th>
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<td>ENDS 101</td>
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<td>LAND 200</td>
<td>Landscape Architecture Theory</td>
<td>3</td>
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<td></td>
<td>HORT 308</td>
<td>Plants for Sustainable Landscapes</td>
<td>3</td>
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<td>LAND 312</td>
<td>Landscape Design IV</td>
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<td>LAND 331</td>
<td>Landscape Construction III</td>
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<td>URPN 202</td>
<td>Building Better Cities</td>
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<td>ENDS 101</td>
<td>Design Process</td>
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<td>LAND 200</td>
<td>Landscape Architecture Theory</td>
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<td>American history (p. 25)</td>
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<td>ARCH 250</td>
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<td>The Evolving City</td>
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<td>URPN 370</td>
<td>Health Systems Planning</td>
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<td>Composition and Rhetoric</td>
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<td>HORT 306</td>
<td>Trees and Shrubs for Sustainable Built Environments</td>
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<td>LAND 241</td>
<td>History and Development of Landscape Architecture in North America</td>
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<td>LAND 311</td>
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### Notes

1. Any approved university core curriculum history course
2. This course will be selected in consultation with the student’s advisor.
3. URPN 320 or URPN 325 or approval of BLA Program Coordinator
4. Semester Away: May be satisfied by study abroad, at another university, internship, or special arrangement by advisor or instructor. Electives may be taken during summer, online, distance education, at another university or college, or at a study abroad university.
5. Study abroad course.
6. If electing to study abroad, must take CARC 311 for PHIL 314 and CARC 331 as an elective.

A grade of C or better is required in College of Architecture courses (CARC, COSC, ENDS, ARCH, URPN, LAND, VIST, ARTS) to satisfy Landscape Architecture degree requirements.

Any student wishing to change majors into the Landscape Architecture program must have less than 60 total hours, including all transfer hours.
<table>
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<td>Trees and Shubs for Sustainable Built Environments</td>
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<td></td>
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**Sixth Year**

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**Landscape Architecture - 6-Year Bachelor of Landscape Architecture/Master of Urban Planning**

**Overview**

The Department of Landscape Architecture and Urban Planning offers a 6-year Bachelor of Landscape Architecture and Master of Urban Planning degree program.

**Program Requirements**

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1. A grade of B or better is required in graduate level courses
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LAND 254 3
POLS 206 3
American history (p. 25) 3

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**Fifth Year**

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<td>or CARC 301 6</td>
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**Sixth Year**

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**Urban and Regional Planning - BS**

The Bachelor of Science in Urban and Regional Planning degree program is based in the Department of Landscape Architecture and Urban Planning (LAUP) within the College of Architecture at Texas A&M University. The Urban and Regional Planning program equips students for entry-level positions in planning allied fields and prepares them for graduate studies in fields such as Urban Planning and Land Development. The core curriculum, designed to equip students with knowledge and skills to deal effectively with the opportunities and challenges inherent in the development, growth and culture of neighborhoods, cities, and regions, is based on theoretical training in the natural, physical, and social sciences. Students acquire skills that enable them to apply these theories to develop communities, cities, and regions which are safe, healthy, and sustainable.

Critical thinking and analytical skills are emphasized for problem-solving at the community and regional scale. Classroom service-learning experiences enable graduates to more reliably and realistically assess complex community problems, design solutions for overcoming those problems, and evaluate the outcomes of programs and policies in meeting community and regional needs.

**Program Requirements**

**First Year**

**Fall**

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**Spring**

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<td>MATH 141 3</td>
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**Third Year**

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**Fifth Year**

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</tr>
<tr>
<td>URPN 201 3</td>
<td></td>
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<tr>
<td>American history (p. 25)</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Semester Credit Hours</td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ARCH 250 3</td>
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<tr>
<td>MATH 142 3</td>
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<td>POLS 207 3</td>
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<th>Course</th>
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<tr>
<td>Semester Credit Hours</td>
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**Graduate coursework 1,2**

<table>
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<table>
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<th>Course</th>
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<tr>
<td>Total Semester Credit Hours</td>
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1. A grade of B or better is required in graduate level courses
2. To be selected in consultation with student's advisory committee.

A grade of C or better is required in College of Architecture undergraduate courses (CARC, COSC, ENDS, ARCH, URPN, LAND, VIST, ARTS) to satisfy Landscape Architecture degree requirements.

Program Requirements
<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
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<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
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<td></td>
<td>URPN 201</td>
<td>The Evolving City</td>
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<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td></td>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
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<td>Semester Credit Hours</td>
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<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<tr>
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<td>RENR 215</td>
<td>Fundamentals of Ecology-Laboratory</td>
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<td></td>
<td>URPN 310</td>
<td>Urban Analytical Methods II</td>
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<td></td>
<td>URPN 330</td>
<td>Land Development I</td>
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<td>Concentration elective</td>
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<tr>
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<td>Semester Credit Hours</td>
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<td>CARC 481</td>
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<td></td>
<td>URPN 302</td>
<td>Planning Law</td>
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<td></td>
<td>URPN 331</td>
<td>Public and Private Infrastructure Funding</td>
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<td>URPN 469</td>
<td>Urban Infrastructure</td>
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<td>URPN 489</td>
<td>Special Topics in...</td>
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<td>6</td>
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<tr>
<td></td>
<td>CARC 301</td>
<td>Field Studies in Design Innovation</td>
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<td></td>
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<td>Internship</td>
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<td>URPN 401</td>
<td>Policy Implementation</td>
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<td>URPN 493</td>
<td>Urban and Regional Studies Capstone Course</td>
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<td></td>
<td>Concentration elective</td>
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<td>Semester Credit Hours</td>
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<tr>
<td>Fall</td>
<td>URPN 205</td>
<td>Fundamentals of Ecology</td>
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<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
<td>3</td>
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<tr>
<td></td>
<td>ECON 202</td>
<td>Principles of Economics</td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
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<td>15</td>
</tr>
</tbody>
</table>

1. See advisor for a list of approved courses.
2. Semester Away: May be satisfied by study abroad, at another university, internship, or special arrangement by advisor or instructor. Electives may be taken during summer, online, distance education, at another university or college, or at a study abroad university.
3. Study abroad course.
4. If electing to study abroad, must take CARC 311 and CARC 331 as electives.
5. This course will be selected in consultation with the student’s advisor. If not participating in study abroad, 3 hours must come from approved course in International and Cultural Diversity (p. 40).

A grade of C or better is required in all courses to satisfy Urban and Regional Planning degree requirements.

**Urban and Regional Planning - 5-Year Bachelor of Science/Master of Land and Property Development**

**Overview**

The Department of Landscape Architecture and Urban Planning offers a 5-year Bachelor of Science and Master of Land and Property Development degree program.

**Program Requirements**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>URPN 201</td>
<td>The Evolving City</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Spring</td>
<td>ARCH 250 or ARCH 345</td>
<td>Survey of World Architecture History II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>URPN 220</td>
<td>Digital Communication I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</tr>
<tr>
<td>Fall</td>
<td>URPN 301</td>
<td>Fundamentals of Ecology</td>
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<td></td>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<td>ECON 202</td>
<td>Principles of Economics</td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
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</table>
## Urban and Regional Planning - 5-Year Bachelor of Science/Master of Urban Planning

### Overview

The Department of Landscape Architecture and Urban Planning offers a 5-year Bachelor of Science and Master of Urban Planning degree program.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>ENGL 104 Composition and Rhetoric 3</td>
</tr>
<tr>
<td></td>
<td>MATH 141 Finite Mathematics 3</td>
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<td>URPN 201 The Evolving City 3</td>
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<td>POLS 206 American National Government 3</td>
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<td></td>
<td>American history (p. 25) 3</td>
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<tr>
<td></td>
<td>Semester Credit Hours 15</td>
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<tr>
<td><strong>Spring</strong></td>
<td>ARCH 250 or ARCH 345 Survey of World Architecture History II or History of Building Technology 3</td>
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<tr>
<td></td>
<td>URPN 220 Digital Communication I 3</td>
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<td></td>
<td>MATH 142 Business Calculus 3</td>
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<td>POLS 207 State and Local Government 3</td>
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<td>American history (p. 25) 3</td>
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#### Second Year

<table>
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<tr>
<td><strong>Fall</strong></td>
<td>URPN 494 or URPN 484 Internship 6</td>
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<td></td>
<td>ELECTIVE 6</td>
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<td>Semester Credit Hours 12</td>
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<td><strong>Spring</strong></td>
<td>URPN 401 Policy Implementation 3</td>
</tr>
<tr>
<td></td>
<td>URPN 493 Urban and Regional Studies Capstone Course 5</td>
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<tr>
<td></td>
<td>ACCT 640 Accounting Concepts and Procedures I 3</td>
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<td></td>
<td>FINC 635 Survey of Finance 3</td>
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#### Third Year

<table>
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<tr>
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<td><strong>Fall</strong></td>
<td>URPN 330 Land Development I 3</td>
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<td>RENR 215 Fundamentals of Ecology–Laboratory 1</td>
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<td></td>
<td>URPN 310 Urban Analytical Methods II 3</td>
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<tr>
<td></td>
<td>Semester Credit Hours 17</td>
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1. A grade of B or better is required for graduate level courses.
2. To be selected in consultation with student's advisory committee.

A grade of C or better is required in all courses to satisfy Urban and Regional Planning degree requirements.
Urban and Regional Planning - Minor

By pursuing a minor in urban planning at Texas A&M, students will earn an education within a multi-disciplinary atmosphere where analytical skills and critical thinking are harvested. Students will then apply this acquired knowledge to address real-world issues which communities and regions face on a daily basis. Those earning a minor in urban planning can effectively solve problems related to a number of complex issues involving the built and natural environment, transportation, health, economic development, among others.

The minor in urban planning program will provide a solid educational basis for those students wishing to pursue a post-graduate education within the planning field. Also, because of its broad scope, the minor program may serve as an effective introduction to graduate studies in other social science disciplines such as economics, geography, political science, and public policy.

The minor program will prepare students for entry-level positions in a variety of fields including state and local government; advocacy, grant-making and civic organizations; real estate management; environmental science; social assistance services; and health care services.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>URPN 201</td>
<td>The Evolving City¹</td>
<td>3</td>
</tr>
<tr>
<td>URPN 202</td>
<td>Building Better Cities²</td>
<td>3</td>
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<tr>
<td>URPN 340</td>
<td>Housing and Community</td>
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<tr>
<td>URPN 361</td>
<td>Urban Issues</td>
<td></td>
</tr>
</tbody>
</table>

¹ The student’s home college or major department may approve/disapprove GEOG 306.
² USAR students will have to take URPN 330.

University Studies Programs

The College of Architecture offers a degree in University Studies. A University Studies degree differs from a traditional “major” in that it consists of a concentration and two minors of 15-18 hours each. The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

Majors

- Bachelor of Science in University Studies, Global Arts, Planning, Design and Construction Concentration (p. 230)

University Studies - BS, Global Arts, Planning, Design and Construction Concentration

The Global Arts, Planning Design and Construction concentration is an interdisciplinary course of study that integrates multiple aspects of the built environment. The course offerings are from all of the professional undergraduate programs within the College of Architecture and are intended to give students an understanding of the interplay of professions that are required to work as a team in order to successfully complete built environment projects. These foundation courses are coupled with a required study abroad experience. All students in the College of Architecture are required to participate in a semester away experience that serves to expand the context of their education. The benefit of this experience is integrated into the concentration at a smaller scale.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ARCH 249</td>
<td>Survey of World Architecture History I</td>
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<tr>
<td>ARCH 250</td>
<td>Survey of World Architecture History II</td>
<td></td>
</tr>
<tr>
<td>ENDS 101</td>
<td>Design Process</td>
<td></td>
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<tr>
<td>LAND 240</td>
<td>History of Landscape Architecture</td>
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<tr>
<td>COSC 153</td>
<td>Introduction to the Construction Industry</td>
<td></td>
</tr>
<tr>
<td>or COSC 25</td>
<td>or Construction Materials and Methods I</td>
<td></td>
</tr>
</tbody>
</table>

¹ The student’s home college or major department may approve/disapprove GEOG 306.
² USAR students will have to take URPN 330.
Leadership
ALED 340 Survey of Leadership Theory 3

Urban Planning
URPN 201 The Evolving City 3
or URPN 202 Building Better Cities

Study Abroad
CARC 481 Seminar 1
CARC 300 College of Architecture Study Abroad (must be led by faculty) 6

Directed electives
Select one of the following: 3

ARCH 246 Foundations of Historic Preservation
ARCH 345 History of Building Technology
ARTS 335 The Art and Architecture of Rome
ARTS 350 The Arts and Civilization
LAND 241 History and Development of Landscape Architecture in North America

College and University Requirements
Communication (p. 22) 6
Mathematics (p. 22) 6
Life and physical sciences (p. 22) 9
Language, philosophy and culture (p. 23) 3
Creative arts (p. 24) 3
Social sciences (p. 25) 3
American history (p. 25) 6
POLS 206 American National Government 3
POLS 207 State and Local Government 3

General Electives 17-23
Minor 1 15-18
Minor 2 15-18

Total Semester Credit Hours 120

A 2.0 GPA is required in all major field of study courses.

Two writing-intensive courses are required.

Two courses must meet the International and Cultural Diversity (p. 40) requirement, however, BUSN 289 cannot be used.

Department of Visualization
Visualization is the study of the art and science used in the creation of traditional and digital visual communication. The Bachelor of Science in Visualization is a studio based program requiring completion of 120 credit hours including areas of traditional art, programming, history and theory as well as digital media. The degree prepares students for the artistic and technical demands facing digital content creators in a variety of visually oriented professions including interactive media, information technology, education, entertainment, and independent practice.

Enrollment in the Visualization Program
Students enrolled in the Bachelor of Science in Visualization (VISL) program will be granted automatic admission to the Sophomore level art and visualization courses by obtaining a 3.6 GPR in category A courses and a 3.0 GPR in category B courses and completing 27 semester credit hours during the first two semesters in the Visualization Program (VISL).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ARTS 115</td>
<td>Drawing for Visualization</td>
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<tr>
<td>VIST 105</td>
<td>Principles of Design I</td>
<td>4</td>
</tr>
<tr>
<td>VIST 106</td>
<td>Principles of Design II</td>
<td>4</td>
</tr>
</tbody>
</table>

Department of Visualization
Visualization

Department of Visualization
Visualization

If AP or Dual Credit courses are available as substitutions in any of the above courses, sequential or other art/visualization/math/science courses taken at Texas A&M University will be used to calculate the respective GPRs. For change of major and transfer students, equivalent transferable courses may be substituted for any of the above courses. In this case, courses taken at Texas A&M University in the same program area will be specified and used to calculate the respective GPRs.

Students not automatically admitted will be allowed on a space available basis into sophomore level art and visualization courses based on a ranking of the combined GPR of the Category A and Category B courses. An optional 500 word essay may be submitted to explain extenuating circumstances related to the 1st year academic experience and provide justification why the student should be allowed to take sophomore level courses. The essay may be used to adjust the overall student ranking.

Transfer and Change of Major Students
Transfer and change of major students (students currently enrolled in another major at Texas A&M University) who are admitted to the Department of Visualization are classified as lower level (VISL).

Faculty
Akleman, Ergun, Professor
Visualization
PHD, Georgia Institute of Technology, 1992

Bieber, Susanne C, Assistant Professor
Visualization
PHD, Freie Universitat Berlin, 2012

Bologan, Anatol, Lecturer
Visualization
MA, Goldsmiths University of London, 2014

Braman, Gavin S, Lecturer
Visualization
BED, Texas A&M University, 2009

Cagin, Gul, Lecturer
Visualization
MFA, Claremont Graduate University, 2001

Campana, Lilia, Instructional Assistant Professor
Visualization
PHD, Texas A&M University, 2014
Chu Yew Yee, Sharon Lynn, Assistant Professor
Visualization
PHD, Texas A&M University, 2015

Davison, Richard R, Professor
Visualization
MFA, Washington University in St. Louis, 1979

Eilers, Howard F, Associate Professor
Visualization
MFA, Ohio University, 1964

Finch, Krista S, Instructional Assistant Professor
Visualization
MFA, Maryland Institute College of Art, 2000

Finch, Sherman S, Assistant Professor
Visualization
MFA, Maryland Institute College of Art, 1998
MA, Maryland Institute College of Art, 1997

Galanter, Philip, Associate Professor
Visualization
MFA, School of Visual Arts, 1999

Honeycutt, Amanda J, Lecturer
Visualization
BS, Texas A&M University, 2011

House, Felice L, Assistant Professor
Visualization
MFA, The University of Texas at Austin, 2011
MS, Texas A&M University, 2006

Jenks, Morgan M, Lecturer
Visualization
MFA, Texas A&M University, 2014

Klein, Barbara J, Lecturer
Visualization
MS, Sam Houston State University, 2008

Knox, Benjamin C, Assistant Professor of the Practice
Visualization
BED, Texas A&M University, 1993

Kouostov, Dmitri V, Lecturer
Visualization
BFA, Ivanovo Art institute, 1987

Lafayette, Carol J, Professor
Visualization
MFA, State University of New York at Buffalo, 1991

Larsen, Terry R, Senior Associate Professor
Visualization
MAR, Cornell University, 1975

Leiderman, Daniil M, Instructional Assistant Professor
Visualization
PHD, Princeton University, 2016

Lisonbee, Laurie J, Lecturer
Visualization
MFA, California State University, Fullerton, 1998

Madrid, Nathan C, Lecturer
Visualization
MFA, Texas Woman’s University, 2014

McLaughlin, Timothy D, Associate Professor
Visualization
MS, Texas A&M University, 1994

McNamara, Ann M, Associate Professor
Visualization
PHD, University of Bristol, United Kingdom, 2000

Parke, Frederic I, Professor
Visualization
PHD, University of Utah, 1974

Quek, Francis K, Associate Professor
Visualization
PHD, University of Michigan, 1990

Ragan, Eric D, Assistant Professor
Visualization
PHD, Virginia Polytechnic Institute and State University, 2013

Ramadan, Hadeel M, Lecturer
Visualization
MFA, Virginia Polytechnic Institute and State University, 2014

Schuld, Dawna L, Instructional Assistant Professor
Visualization
PHD, The University of Chicago, 2009

Seo, Jinsil, Assistant Professor
Visualization
PHD, Simon Fraser University, 2011
MFA, School of Visual Arts, 2004

Serra, Gianvito N, Lecturer
Visualization
BFA, Ringling College of Art and Design, 2001

Stoeneescu, Livia, Instructional Assistant Professor
Visualization
PHD, Queen’s University, Canada, 2010

Sutherland, Susan D, Lecturer
Visualization
MA, University of Wisconsin - Madison, 1994

Tassinary, Louis G, Professor
Visualization
JD, Boston College, 2003
PHD, Dartmouth College, 1984

Thomas, Andre, Lecturer
Visualization

Zawadzki, Mary F, Instructional Assistant Professor
Visualization
PHD, The City University of New York, 2015

Majors

- Bachelor of Science in Visualization (p. 233)
Minors

- Art Minor (p. 233)
- Game Design and Development Minor (p. 234)

Visualization - BS

The mission of the Bachelor of Science in Visualization program is to engage and develop the student’s visual, intuitive and analytical capabilities through the scientific and aesthetic issues surrounding the use of technology in visual communication. To fulfill its mission, the program requires both a creative spirit and the technical understanding to adapt to the changing demands of the visual industries served by the departmental programs.

The curriculum integrates elements of fine arts, three-dimensional design, scientific inquiry and digital technology to provide a broad, wide-ranging educational experience. The core of the program is the studio experience, which explores the relationship between theory and practice through a variety of exercises and projects using traditional and electronic media. A variety of directed electives allows the student to gain an in-depth understanding in an area of specialization.

Graduates of the program are prepared to be technically adept artists, designers and/or tool-makers capable of utilizing interactive and directed media. Employment may be found in such fields as graphic and web design, the entertainment industry (game design and development, animation and visual effects), as well as fields such as architectural presentation, modeling and simulation, and other fields where visualization contributes to understanding. Alternatively, graduates may enter graduate programs that emphasize digital media in either computer science or art/design. Two such programs, the Master of Science (MS) in Visualization and the Master of Fine Arts (MFA) in Visualization, are offered by the Department of Visualization at Texas A&M University.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Visualization Curriculum</strong></td>
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<tr>
<td></td>
<td>Visualization Studio</td>
<td>28</td>
</tr>
<tr>
<td>ARTS 149</td>
<td>Art History Survey I</td>
<td>3</td>
</tr>
<tr>
<td>ARTS 349</td>
<td>The History of Modern Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTS 104</td>
<td>Introduction to Graphic Design</td>
<td>1</td>
</tr>
<tr>
<td>ARTS 115</td>
<td>Drawing for Visualization</td>
<td>3</td>
</tr>
<tr>
<td>ARTS 212</td>
<td>Life Drawing</td>
<td>3</td>
</tr>
<tr>
<td>VIST 201</td>
<td>Writing for Design</td>
<td>1</td>
</tr>
<tr>
<td>VIST 170</td>
<td>Introduction to Visualization</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Computing Environments</td>
<td></td>
</tr>
<tr>
<td>VIST 270</td>
<td>Computing for Visualization I</td>
<td>3</td>
</tr>
<tr>
<td>VIST 271</td>
<td>Computing for Visualization II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Take the following course three times.</td>
<td>3</td>
</tr>
<tr>
<td>VIST 284</td>
<td>Visualizations Techniques</td>
<td></td>
</tr>
<tr>
<td>VIST 375</td>
<td>Foundations of Visualization</td>
<td>3</td>
</tr>
<tr>
<td>VIST 441</td>
<td>Scientific and Technological</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Developments in Visual Arts</td>
<td></td>
</tr>
<tr>
<td>Directed electives</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Free electives</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**University Core Curriculum**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Communication (p. 22)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ARTS 150</td>
<td>Art History Survey II</td>
<td>3</td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>HIST 106</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 120

1 Select from any 300-499 course not used elsewhere. If you do not participate in study abroad, 3 hours will come from ICD.

A grade of C or better must be made in all College of Architecture courses (ARCH, ARTS, CARC, COSC, ENDS, LAND, LDEV, VIST, URPN and VIZA). Students must also make a grade of C or better in any course used as an equivalent substitution for College of Architecture courses that satisfy degree requirements.

Art - Minor

Students pursuing other majors may minor in Art by taking a minimum of 18 hours. There are two emphases within the minor, traditional media and new media. A minimum of six hours of 300-400 level courses is required.

Students must have a minimum cumulative GPR of 3.00 and must maintain a “C” average or better in all courses completed as part of the minor in Art. The student’s home college/department may grant, with agreement from the Department of Visualization, transfer credit of no more than six credit hours. Transfer credit will not be accepted for any 300- or 400-level course. Credit for study abroad (CARC) courses may not be applied to the minor in Art if an on-campus course containing similar content is offered.

A grade of ‘C’ or better is required for all courses used towards the minor. Per University guidelines, the student’s home college/department is responsible for advising students pursuing a minor in Art.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTS 349</td>
<td>The History of Modern Art</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following emphases:

Traditional Media Emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTS 111</td>
<td>Drawing I</td>
<td>3</td>
</tr>
</tbody>
</table>

Select four from the following:

- ARTS 212 Life Drawing
- ARTS 305 Painting I
- ARTS 308 Sculpture
- ARTS 311 Black and White Photography
- ARTS 312 Advanced Photography
- ARTS 353 Color Theory
The Minor in Game Design and Development offers students the opportunity to develop the knowledge and skills associated with the aesthetic and technical aspects of game creation. The minor consists of 16 credit hours, 10 credit hours are required courses and six are from a prescribed menu of courses. The minor provides a foundation in the principles of game design and software development. Students develop core competencies, collaborate on the design and development of game projects, and engage in authentic, situated creative problem-solving to broaden their horizons as interdisciplinary team members.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 110 &amp;</td>
<td>Programming I &amp; Introduction to Computer Science</td>
<td>4</td>
</tr>
<tr>
<td>CSCE 111</td>
<td>Concepts and Programming</td>
<td></td>
</tr>
<tr>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts</td>
<td></td>
</tr>
<tr>
<td>CSCE 441</td>
<td>Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>or VIST 486</td>
<td>or Introduction to Game Design</td>
<td></td>
</tr>
</tbody>
</table>

Minimum of 6 hours of 300- or 400-level courses are required.

Students must make a grade of "C" or better in all courses.

Minimum GPA of 3.2 for admittance into the minor.

A grade of 'C' or better is required for all courses used towards the minor.
**MAYS BUSINESS SCHOOL**

**Administrative Officers**
Dean - Eli Jones, Ph.D.
Associate Dean - Martha L. Louder, Ph.D.
Director of Academic Services - Peter K. Driesdale, M.S.

**General Statement**
A goal of Mays Business School is to help develop students to become effective managers, concerned citizens and lifelong learners. Through challenging academic and enrichment programs, the business school provides students with numerous opportunities for intellectual, leadership and personal development.

In support of this student development goal, the curriculum in business has a dual emphasis—a broad-based education in the foundation disciplines of the liberal arts and the sciences, and a focused development of business knowledge and behavioral skills.

The program of study in business provides students a background in the basic academic areas—mathematics, language, philosophy and culture; life and physical, social and behavioral sciences; and, rhetoric and composition. Students simultaneously pursue introductory coursework in accounting, economics, business information systems and the legal environment of business. This broad educational foundation provides an enriching dimension to the university experience that cannot be attained in a more limited course of study.

Upon successful completion of this broad-based coursework, the student will begin to focus on a major field of study and a full range of business courses. The major field—chosen from the fields of accounting, finance, management, management information systems, marketing, and supply chain management—is designed to prepare students for an entry-level organizational position as well as subsequent career development. Each major has a set of required courses, as well as electives, from which students may gain additional depth in the chosen area. Students admitted to Mays Business Honors pursue an interdepartmental degree in business honors.

This combination of a broad educational foundation and more specialized study produces graduates uniquely qualified to deal with the rapidly changing and diverse global economy.

**Requirements for Graduation**
Requirements for graduation are listed in the Texas A&M University Student Rules and this catalog.

With the exception of general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

In addition, students in Mays Business School must have a GPR of 2.0 in the courses included in the Core Business Knowledge. Undergraduate business students must take two writing-designated (W) business courses. The requirement may be met by taking two writing (W) business courses or one W business course and one oral communication (C) business course. These W and C courses are major specific and are taken as part of the student’s upper-level coursework. See an academic advisor for additional information.

**Transfer of Credits**
Acceptance of transfer of credit for business courses will generally be limited to those courses taught in the freshman and sophomore years at this institution. Transfer credit is not offered for upper-level business courses.

**Credit by Examination**
Undergraduate students may receive credit for certain courses required in undergraduate business curricula by successfully completing Advanced Placement (AP), College Level Exam Program (CLEP) and departmental credit by exam. Students should contact the Undergraduate Advising Office (Room 238, Wehner Building) for information. Information concerning AP, CLEP and departmental credit by examination may be obtained from the Data and Research Services (http://dars.tamu.edu) website or (979) 845-0532. A fee is charged for such an examination.

Students may not receive credit by examination for courses in which they are enrolled, which they have previously failed, or which are prerequisite to courses for which they already have credit.

**Bachelor’s Degrees and Departments of Instruction**
The academic program of Mays Business School is organized in the following majors: Accounting, Business Honors, Finance, Management, Management Information Systems, Marketing, and Supply Chain Management. Bachelor of Business Administration degrees are offered in each of these seven majors.

A Bachelor of Science in University Studies with concentration in business (USBU) is offered.

**Bachelor of Business Administration**
The degree of Bachelor of Business Administration is offered in these seven majors: accounting, business honors, finance, management, management information systems, marketing, and supply chain management. Each requires a minimum of 120 semester credit hours of study. The student elects one of these as a “major,” but is also required to study fundamental theory and procedure in each of the basic business functions. In addition, the student takes courses essential to a general liberal education.

The following is a representation of the curriculum requirements by major.
### Internships

6

### Other required courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>FIN 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Semester Credit Hours

120

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1 Selected from a list of approved international electives for business students. In the BBA curricula, the 6 hours of approved international elective courses simultaneously fulfill the University's International and Cultural Diversity graduation requirement. Management majors must take MGMT 450/IBUS 450.

2 Management majors are advised to take PSYC 107 or SOCI 205.

---

### BBA Core Business Knowledge

**Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>FIN 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

---

### Upper-Level Entry into Accounting, Business Honors, Finance, Management, Management Information Systems, Marketing and Supply Chain Management (BBA)

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven BBA majors: accounting, business honors, finance, management, management information systems, marketing, and supply chain management.

---

### Cooperative Education

Cooperative education is designed to augment the academic program of study with on-the-job training. To be eligible to participate, a business undergraduate must have completed 45 credit hours and have a minimum 2.5 GPA. Interested students may obtain more information from the Career Center (http://careercenter.tamu.edu) website or (979) 845-5139 or in Room 209, Koldus Building.

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### Restrictions on Two Degrees

Mays Business School is enrollment managed; demand for admission to the undergraduate business program consistently exceeds available educational resources. Priority is given to qualified applicants for their initial bachelor's degree.

**Double Major**

Only Business Honors majors may elect a second major field of study within the BBA degree. The first major must be business honors. The Business Honors student must satisfy all University and Business School requirements and complete all curriculum requirements for each major. This option leads to the granting of one BBA degree with two majors. Additional restrictions may apply.

**Double Degree**

Approval of double degrees (BBA with BA or BS) is granted by exception only. A written appeal for a double degree may be submitted; the appeal should reflect an excellent academic record, support from the BA or BS granting college, and a compelling justification.

**Second Degree**

Postbaccalaureate admission to Mays is severely restricted and granted by exception only. Applicants for a postbaccalaureate business degree may present a case for an exception to this enrollment restriction in the essay of a complete Texas A&M admission application. Generally,
eligible applicants are denied postbaccalaureate admission but may be encouraged to apply, instead, to an appropriate graduate degree program.

Certificate Programs
Mays offers certificate programs for undergraduate students who want to explore a particular topic area in more depth. Most are open to all BBA majors, and some are designed for specific majors who wish to specialize in a particular area in the major field of study.

Students who pursue any of the certificate programs must complete all requirements for the specific program prior to graduation. Certificates are noted on the transcript after graduation. Information regarding certificates programs and requirements can be found in the Mays Business School Certificates section.

Mays Business School
International: Each program offers BBA degree seeking students the opportunity to study international business and other cultures to develop foundation knowledge to meet global business challenges.

- European Union Business Certificate (p. 241)
- International Business Studies Certificate (p. 241)
- Latin American Business Certificate (p. 242)

Nonprofit and Social Innovation: Offers BBA degree seeking students high-impact educational opportunities that will equip them to contribute positively to nonprofit and social purpose organizations.

- Nonprofit and Social Innovation Certificate (p. 244)

Department of Accounting
- Energy Accounting Certificate (p. 250)
- Internal Audit Certificate (p. 250)

Department of Finance
- Commercial Banking Certificate (p. 253)
- Investment Banking Certificate (p. 253)
- Trading, Risk and Investments Certificate (p. 254)

Department of Management
- Entrepreneurial Leadership Certificate (p. 271)

Department of Marketing
- Advertising Strategy Certificate (p. 281)
- Analytics and Consulting Certificate (p. 281)
- Retail Buying and Management Certificate (p. 282)
- Professional Selling and Sales Management Certificate (p. 282)

International and Cultural Diversity Requirement
Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the University’s Graduation requirement. Business students meet this requirement by taking six (6) hours of coursework from an approved list of international elective courses.

In the BBA curricula the 6 hours of approved international elective coursework simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.

Majors
Mays Business School
- Bachelor of Business Administration in Business Honors (p. 238)
- Bachelor of Science in University Studies, Business Concentration (p. 283)

Department of Accounting
- Bachelor of Business Administration in Accounting (p. 246)
- Bachelor of Business Administration in Accounting and Master of Financial Management, 5-Year Program (p. 248)
- Bachelor of Business Administration in Accounting and Master of Science, 5-Year Degree Program (p. 249)

Department of Finance
- Bachelor of Business Administration in Finance (p. 251)

Department of Information and Operations Management
- Bachelor of Business Administration in Management Information Systems (p. 255)
- Bachelor of Business Administration in Supply Chain Management (p. 257)

Department of Management
- Bachelor of Business Administration in Management, Consulting/General Management Track (p. 261)
- Bachelor of Business Administration in Management, Entrepreneurial Leadership Track (p. 263)
- Bachelor of Business Administration in Management, Human Resource Management Track (p. 265)
- Bachelor of Business Administration in Management, Nonprofit Management Track (p. 267)
- Bachelor of Business Administration in Management, Pre-Law Track (p. 269)

Department of Marketing
- Bachelor of Business Administration in Marketing, Advertising Strategy Track (p. 273)
- Bachelor of Business Administration in Marketing, Analytics and Consulting Track (p. 275)
- Bachelor of Business Administration in Marketing, Professional Selling and Sales Management Track (p. 277)
• Bachelor of Business Administration in Marketing, Retail Buying and Management Track (p. 279)

Minors

Mays Business School
• Business Minor (p. 240)

Certificates

Mays Business School
• European Union Business Certificate (p. 241)
• International Business Studies Certificate (p. 241)
• Latin American Business Certificate (p. 243)
• Nonprofit and Social Innovation Certificate (p. 244)

Department of Accounting
• Energy Accounting Certificate (p. 249)
• Internal Audit Certificate (p. 250)

Department of Finance
• Commercial Banking Certificate (p. 253)
• Investment Banking Certificate (p. 253)
• Trading, Risk and Investments Certificate (p. 254)

Department of Management
• Entrepreneurial Leadership Certificate (p. 271)

Department of Marketing
• Advertising Strategy Certificate (p. 281)
• Analytics and Consulting Certificate (p. 281)
• Retail Buying and Management Certificate (p. 282)
• Professional Selling and Sales Management Certificate (p. 282)

Masters

Mays Business School
• Master of Business Administration in Business Administration (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/interdepartmental/mba)
• Mays Executive MBA Program (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/interdepartmental/executive-mba)
• Mays Professional MBA Program (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/interdepartmental/professional-mba)

Department of Accounting
• Master of Science in Accounting (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/accounting/ms)

Department of Finance
• Master of Financial Management in Financial Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/finance/mfm)
• Master of Real Estate in Land Economics and Real Estate (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/finance/mre)
• Master of Science in Finance (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/finance/ms)

Department of Information and Operations Management
• Master of Science in Management Information Systems (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/information-operations-management/ms)

Department of Management
• Master of Science in Entrepreneurial Leadership (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/management/entrepreneurial-leadership-ms)
• Master of Science in Human Resource Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/management/ms)

Department of Marketing
• Master of Science in Marketing (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/marketing/ms)

Doctoral

Mays Business School
• Doctor of Philosophy in Business Administration (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/interdepartmental/phd)

Department of Management
• Doctor of Philosophy in Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/business/management/phd)

Business Honors - BBA

Selection through a separate application process is required to participate in Business Honors. Students apply to Business Honors as incoming freshmen or during the spring semester of their freshman year. Both are competitive selection processes. More information is available at http://mays.tamu.edu/businesshonors.

Bachelor of Business Administration

A Bachelor of Business Administration (BBA) in Business Honors is a degree available only to students admitted to Mays’ Business Honors program. The Business Honors major is designed for students whose academic excellence is matched by strong character, leadership skills, and teamwork. The Business Honors major prepares students to begin careers in all fields or to continue on to a graduate program or professional school.

Students pursuing a BBA in Business Honors must maintain a cumulative GPA of 3.5 or higher and meet other program requirements to continue in Business Honors. Students are required to complete a total of 30 hours of honors coursework plus an internship for credit. Other program requirements apply.
Business Honors majors work closely with an academic advisor to identify a set of courses to meet their academic goals. They may pursue a double major in Business Honors and one of the six other BBA majors (accounting, finance, management, management information systems, marketing and supply chain management).

**Upper-level Entry Requirements and Application Procedures**

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level. **Note:** To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION. 
   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. **Transfer students:** Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. **Change of curriculum students:** Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

**Program Requirements**

**Lower-Level Business Program (BUAD)**

<table>
<thead>
<tr>
<th>First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>Code</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 202</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>MATH 140</td>
</tr>
<tr>
<td>MATH 142</td>
</tr>
<tr>
<td>American history (p. 25)</td>
</tr>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>Select one of the following:</td>
</tr>
<tr>
<td>COMM 203</td>
</tr>
<tr>
<td>COMM 205</td>
</tr>
<tr>
<td>COMM 243</td>
</tr>
<tr>
<td>ENGL 104</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>Code</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>ECON 202</td>
</tr>
<tr>
<td>MATH 142</td>
</tr>
<tr>
<td>American history (p. 25)</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>Code</td>
</tr>
<tr>
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</tr>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>POLS 206</td>
</tr>
<tr>
<td>Communication</td>
</tr>
</tbody>
</table>
Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 15

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 15

**Total Semester Credit Hours** 60

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.
2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).
3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

**Management Information Systems**: Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

**Business Honors**: Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

**Finance**: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower level). The general elective taken in the senior year can be reduced by 1 credit.

**Upper-Level Business Honors Program**

**Third Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>International elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 15

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>Upper-Division Business Elective 4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Upper-Division Business Elective 4</td>
<td></td>
<td>3</td>
</tr>
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</table>

**Semester Credit Hours** 15

**Total Semester Credit Hours** 60

1. Five of the nine Common Body of Knowledge classes listed must be taken as honors: ACCT 229, ACCT 230, FINC 341, ISTM 210, SCMT 303, SCMT 364, MGMT 211, MGMT 363, MKTG 321.
2. Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.
3. Six hours required. A complete list of approved courses is available in the Undergraduate Advising Office, Room 238, Wehner Building. In the BBA curricula, the 6 hours of approved international elective courses simultaneously fulfill the University's International and Cultural Diversity Graduation requirement.
4. Any 300- or 400-level business course (ACCT, FINC, IBUS, ISTM, MGMT, MKTG, SCMT) except FINC 341, 409; MGMT 309, 363, 466; MKTG 321, 409; SCMT 303, 309, 364. At least one course must be designated as writing designated (W) or oral communication (C). Select in consultation with an academic advisor.
5. Must be taken as honors.

**Fourth Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 484</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Upper-Division Business Elective 4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Upper-Division Business Elective 4</td>
<td></td>
<td>3</td>
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</table>

**Semester Credit Hours** 15

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>International elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Upper-Division Business Elective 4</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 12

**Total Semester Credit Hours** 54

**Total Program Hours 120**

**Business - Minor**

Mays Business School offers a business minor for undergraduate non-business majors.

Students interested in pursuing a future MBA may find that when combined with appropriate statistics and economics coursework, the business minor provides a foundational knowledge in the basic aspects of business required by most MBA programs.

Students applying for a business minor must have a 2.0 or better overall GPA. Application is made in the student's home college or major department.

**Program Requirements**

The minor in business consists of six specific courses chosen to develop a foundational knowledge in the basic aspects of business, including accounting, finance, management, marketing, and management information systems.
The courses listed below constitute the 18 hours required for a minor in business.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles (or TCCNS ACCT 2301 or 2401)</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society (or Blinn College BUSI 2371)</td>
<td>3</td>
</tr>
<tr>
<td>FINC 409</td>
<td>Survey of Finance Principles</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 409</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

1. Course must be taken in residence at Texas A&M. No transfer courses or substitutions will be allowed.
2. Credit by exam is offered for students who have not taken ISTM 209 but can demonstrate mastery of the concepts. See dars.tamu.edu/testing.
3. MGMT 212 cannot be used to meet this requirement.

Students must earn a grade of "C" or better in each course listed above to be awarded the business minor and receive transcript recognition.

**European Union Business - Certificate**

The Certificate in European Business (EUB) is designed to provide Mays Business School undergraduate students seeking a BBA degree the opportunity to gain a better understanding of European business by studying its history, politics, and business models.

The EUB requires 21 credit hours of course work that can be integrated as part of the BBA business curriculum. Also, a European Union (EU) international experience is required along with demonstration of the ability to conduct business transactions in an EU language (other than English).

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBUS 456</td>
<td>European Integration and Business</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select three of the following international business courses:</td>
<td>9</td>
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<tr>
<td></td>
<td>ACCT 445/ IBUS 445</td>
<td>International Accounting</td>
</tr>
<tr>
<td></td>
<td>AGEC 452</td>
<td>International Trade and Agriculture</td>
</tr>
<tr>
<td></td>
<td>AGEC 453</td>
<td>International Agribusiness Marketing</td>
</tr>
<tr>
<td></td>
<td>FINC 445/ IBUS 446</td>
<td>International Finance</td>
</tr>
<tr>
<td></td>
<td>IBUS 455</td>
<td>Asian Business Environment</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>21</td>
</tr>
</tbody>
</table>

1. IBUS 456 or another course that focuses specifically on conducting business in the European Union. Must have prior approval.
2. Three hours must be taken in the student’s business major.
3. Either AGEC 452 or AGEC 453 is required for AGBU majors.

**Approved European Union Experience**

An approved international experience in an EU country: 1 month minimum. Options available include:

- Mays or university-wide reciprocal exchange program
- Mays or TAMU study abroad program or field trip
- International internship (for IBUS 484 credit)
- Other study abroad or volunteer program (with prior approval)

**Foreign Language Competence**

To determine competence in a non-English European Union language, a student must pass an oral competency exam in their desired EU language as administered by a Mays faculty member, or pass a designated proficiency exam upon completion of the European Union experience.

**International Business Studies - Certificate**

The Certificate in International Business Studies (IBS) is designed to offer Mays Business School undergraduate students seeking a BBA degree the
opportunity to study international business and other cultures to develop a knowledge foundation to meet global business challenges.

The IBS requires 18 credit hours of course work that can be integrated as part of the BBA business curriculum. Also, an international experience is required. Students who pursue the IBS certificate program must complete all requirements prior to graduation.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select four of the following international business courses:</td>
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</tr>
<tr>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>ACCT 445/IBUS 445</td>
<td>International Accounting</td>
<td></td>
</tr>
<tr>
<td>AGEC 452</td>
<td>International Trade and Agriculture</td>
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<tr>
<td>AGEC 453</td>
<td>International Agribusiness Marketing</td>
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<tr>
<td>FINC 445/IBUS 446</td>
<td>International Finance</td>
<td></td>
</tr>
<tr>
<td>IBUS 455</td>
<td>Asian Business Environment</td>
<td></td>
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<tr>
<td>IBUS 456</td>
<td>European Integration and Business</td>
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</tr>
<tr>
<td>IBUS 457/MGMT 457</td>
<td>Global Entrepreneur</td>
<td></td>
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<tr>
<td>IBUS 458</td>
<td>International Negotiations</td>
<td></td>
</tr>
<tr>
<td>IBUS 459</td>
<td>Latin American Markets</td>
<td></td>
</tr>
<tr>
<td>MGMT 450/IBUS 450</td>
<td>International Environment of Business</td>
<td></td>
</tr>
<tr>
<td>MGMT 452/MGMT 452</td>
<td>International Management</td>
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<tr>
<td>MKTG 401/IBUS 401</td>
<td>Global Marketing</td>
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<tr>
<td>MKTG 402</td>
<td>International Marketing: Study Abroad</td>
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<td>Select one of the following options:</td>
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<tr>
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<tr>
<td></td>
<td>4</td>
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<tr>
<td>ANTH 205</td>
<td>Peoples and Cultures of the World</td>
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<tr>
<td>ANTH 300</td>
<td>Cultural Change and Development</td>
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<tr>
<td>ANTH 314</td>
<td>Agrarian Peasant Societies</td>
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<tr>
<td>COMM 335</td>
<td>Intercultural Communication</td>
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<tr>
<td>ECON 320</td>
<td>Economic Development of Europe</td>
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<td>ECON 324</td>
<td>Comparative Economic Systems</td>
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<td>ECON 330</td>
<td>Economic Development</td>
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<td>FREN 301</td>
<td>French Society and Culture in Evolution</td>
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<tr>
<td>FREN 322</td>
<td>French Literature II</td>
<td></td>
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<tr>
<td>FREN 336</td>
<td>Politics, Culture and Society in Contemporary France</td>
<td></td>
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<td>FREN 418</td>
<td>Seminar in French Civilization</td>
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<tr>
<td>GEOG 202</td>
<td>Geography of the Global Village</td>
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<td>GEOG 311</td>
<td>Cultural Geography</td>
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<tr>
<td>GEOG 320</td>
<td>The Middle East</td>
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</tr>
<tr>
<td>GEOG 323</td>
<td>Geography of Latin America</td>
<td></td>
</tr>
<tr>
<td>GERM 322</td>
<td>German Culture and Civilization II</td>
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<tr>
<td>HIST 210</td>
<td>Russian Civilization</td>
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<tr>
<td>HIST 305</td>
<td>Mexican-American History 1848-Present</td>
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<td>HIST 336</td>
<td>Europe Since 1919</td>
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<td>HIST 339</td>
<td>Eastern Europe Since 1453</td>
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<tr>
<td>HIST 342</td>
<td>Latin America Since 1810</td>
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<td>HIST 345/AFST 345</td>
<td>Latin America</td>
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</tr>
<tr>
<td>HIST 346/AFST 346</td>
<td>History of South Africa</td>
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<td>HIST 348</td>
<td>Modern Middle East</td>
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<td>HIST 352/ASIA 352</td>
<td>Modern East Asia</td>
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<td>HIST 355/ASIA 355</td>
<td>Modern China</td>
<td></td>
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<tr>
<td>HIST 356</td>
<td>Twentieth Century Japan</td>
<td></td>
</tr>
<tr>
<td>HIST 402</td>
<td>Germany Since 1815</td>
<td></td>
</tr>
<tr>
<td>HIST 407</td>
<td>History of France Since 1815</td>
<td></td>
</tr>
<tr>
<td>HIST 412</td>
<td>Soviet Union 1917-1991</td>
<td></td>
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<td>HIST 439</td>
<td>Twentieth Century Britain</td>
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</tr>
<tr>
<td>HIST 440</td>
<td>Latin American Cultural and Intellectual History</td>
<td></td>
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<tr>
<td>HIST 441</td>
<td>History of Mexico, 1821 to the Present</td>
<td></td>
</tr>
<tr>
<td>HIST 449</td>
<td>History of Brazil, 1822 to the Present</td>
<td></td>
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<tr>
<td>HIST 464</td>
<td>International Developments Since 1918</td>
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</tr>
<tr>
<td>HIST 477/WGST 477</td>
<td>Women and Gender in Modern European History</td>
<td></td>
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<tr>
<td>POLS 322</td>
<td>Western European Government and Politics</td>
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</tr>
<tr>
<td>POLS 323</td>
<td>Political Systems of Latin America</td>
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</tr>
<tr>
<td>POLS 324</td>
<td>Politics of Global Inequality</td>
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<tr>
<td>POLS 338</td>
<td>Government and Politics of the Former Soviet Union</td>
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</tr>
<tr>
<td>POLS 365/ASIA 365</td>
<td>Asian Governments and Politics</td>
<td></td>
</tr>
<tr>
<td>SOCI 325/ASIA 325</td>
<td>International Business Behavior</td>
<td></td>
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<td>SOCI 329/ASIA 329</td>
<td>Pacific Rim Business Behavior</td>
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<tr>
<td>SPAN 312</td>
<td>Hispanic Culture and Civilization: 18th Century to Present</td>
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<td>SPAN 320</td>
<td>Introduction to Hispanic Literature</td>
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<td>SPAN 410</td>
<td>Hispanic Film</td>
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<td>SPAN 411</td>
<td>Contemporary Hispanic Society and Culture</td>
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<td>SPAN 412</td>
<td>U.S. Hispanic Writers</td>
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</tr>
<tr>
<td>SPAN 421</td>
<td>Spanish Language Poetry</td>
<td></td>
</tr>
</tbody>
</table>
Contemporary Spanish and Spanish-American Literature

Total Semester Credit Hours 18

1 Three hours must be taken in the student's business major. Business courses taken through Mays and university-wide exchange may also be approved.

2 Either course is required for AGBU majors.

3 Must be the same language (e.g. SPAN 101 & SPAN 102) and taken at the university level. Credit-by-exam not allowed.

4 Non-business courses taken abroad as part of a TAMU faculty-led, semester exchange program, or through direct enrollment in a foreign institution may also be used to satisfy this requirement.

Approved International Experience

An approved international experience, one month minimum, is required. Options available include:

- Mays or university-wide reciprocal exchange program
- Mays or TAMU study abroad program or field trip
- International internship (for IBUS 484 credit)
- Other study abroad or volunteer program (with prior approval)

Latin American Business - Certificate

The Certificate in Latin American Business (LAB) is designed to provide Mays Business School undergraduate students seeking a BBA degree the opportunity to gain a better understanding of Latin American business by studying its history, politics and business models.

The LAB requires 21 credit hours of course work that can be integrated as part of the BBA business curriculum. Also, a Latin American international experience is required along with demonstration of the ability to conduct business transactions in Spanish or Portuguese.

Students who pursue the LAB certificate program must complete all requirements prior to graduation.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>One course on Latin American business: 1</td>
<td>IBUS 459 Latin American Markets 1</td>
<td>3</td>
</tr>
<tr>
<td>Select three of the following international business courses: 2</td>
<td>ACCT 445/IBUS 445 International Accounting</td>
<td>9</td>
</tr>
<tr>
<td>FINC 445/IBUS 446 International Finance</td>
<td>IBUS 455 Asian Business Environment</td>
<td></td>
</tr>
<tr>
<td>IBUS 455 European Integration and Business</td>
<td>IBUS 458 International Negotiations</td>
<td></td>
</tr>
<tr>
<td>IBUS 460 Academy for Future International Leaders</td>
<td>IBUS 484 International Business Internship</td>
<td></td>
</tr>
<tr>
<td>IBUS 484</td>
<td>IBUS 489 Special Topics in...</td>
<td></td>
</tr>
<tr>
<td>MGMT 450/IBUS 450 International Environment of Business</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 21

1 IBUS 459 or another course that focuses specifically on conducting business in Latin America (must have prior approval).

2 Three hours must be taken in the student’s business major.

Approved Latin American Experience

An approved international experience in a Latin American country, a minimum of 1 month. Options available include:

- Mays or university-wide reciprocal exchange program
- Mays or TAMU study abroad program or field trip
- International internship (for IBUS 484 credit)
- Other study abroad or volunteer program (with prior approval)
Foreign Language Competence
To determine competence in Spanish or Portuguese, a student must pass an oral competency exam administered by a Mays faculty member, or pass a designated proficiency exam upon completion of the Latin American experience.

Nonprofit and Social Innovation - Certificate
The Certificate in Nonprofit and Social Innovation provides students with high-impact educational opportunities that will equip them to contribute positively to nonprofit and social purpose organizations.

The certificate includes 13 hours of coursework and an internship with a social purpose organization (nonprofit or for-profit) that will enhance a student’s undergraduate education to include preparation for occupations, service roles, and graduate study.

Organizations around the world are increasingly recognizing the importance of addressing societal challenges. This certificate allows students to contribute toward the goal of advancing the world’s prosperity.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Required Courses</th>
<th>Elective Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 232</td>
<td>Resource Development</td>
<td>3</td>
<td>Select two of the following:</td>
</tr>
<tr>
<td></td>
<td>or BUSN 48 or Special Topics in...</td>
<td></td>
<td>BUSN 489 Special Topics in... (Strategic Philanthropy)</td>
</tr>
<tr>
<td>BUSN 302</td>
<td>Nonprofit Perspectives</td>
<td>1</td>
<td>EHRD 479 Grants and Contracts</td>
</tr>
<tr>
<td>MGMT 432</td>
<td>Managing the Nonprofit Organization</td>
<td>3</td>
<td>MGMT 460 Managing Projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MKTG 440 Services Marketing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MKTG 432 Corporate Social Responsibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RPTS 308 Foundations of Community and Community Development</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. BUSN 489 Strategic Philanthropy.
2. The Nonprofit Sector or Business Solutions to Solve Social Problems.

An internship with a social purpose organization (nonprofit or for-profit) is required. The internship does not need to be taken for academic credit. An internship completed for a student’s major (e.g., MGMT 484, MKTG 484, FINC 484, ISTM 484, SCMT 484 or ACCT 484) may be applied to this certificate provided it is with a social purpose organization (nonprofit or for-profit). The internship must offer meaningful, professional-level opportunities to apply business knowledge and skills.

Exceptions based on course offerings require Certificate Coordinator approval.

Department of Accounting
The accounting profession continues to be recognized as one of the world’s leading professions and as one offering many opportunities for a challenging career. The major challenge confronting the accounting profession today is the continuous development of accounting and information systems that can be utilized by business firms operating in an increasingly complex global environment. Within this environment, business firms and government units are generating and utilizing information at an accelerating rate.

A degree in accounting provides the opportunity for entry into a career offering a variety of different and challenging paths. Many accounting graduates are employed by public accounting firms that provide assurance, tax and other services to all types of organizations. Other accounting graduates pursue careers with business firms and financial institutions, with all levels of government and as accounting educators.

All of these careers provide an opportunity to earn the Certified Public Accountant (CPA) license and to serve society by maintaining the highest levels of integrity. The program listed in the following tables for the junior and senior years leads to the Bachelor in Business Administration (BBA) degree. This degree program provides the minimum credentials necessary for entry into most accounting careers. However, the BBA degree does not meet the requirements to sit for the CPA examination in Texas.

The American Institute of Certified Public Accountants (AICPA) recognizes the need for technically competent graduates entering the accounting profession. In response to the recommendations of the AICPA, other professional accounting organizations, and many professional accounting firms, the State of Texas requires candidates for the CPA certificate to have a minimum of 150 semester hours of college coursework, including at least 36 hours of accounting courses. As a consequence, highly motivated students are encouraged to give serious consideration to pursuing advanced studies at the graduate level to enhance their potential for a successful accounting career.

The Department of Accounting offers an integrated Professional Program that students enter during their junior year. The Professional Program offers a curriculum integrating undergraduate and graduate education. Graduates receive a BBA and a Master of Science degree (MS). This program offers opportunities for successful and motivated students to pursue academic coursework that challenges both their interests and abilities. The courses are taught by experienced faculty with superior teaching and professional credentials and are limited in class size.

The objectives of the Professional Program include developing sound conceptual, technical, analytical and communication skills that are required for success in the accounting profession. The program develops decision making and teamwork skills through extensive use of discussions and case studies. The program enables the student to select a specialization in assurance services/information management, information systems, financial management, marketing, entrepreneurship, or taxation. Each track offers the student an opportunity to participate in a professional accounting internship.

The department also offers a traditional Master’s Program (MS in Accounting) that students enter after completion of the Bachelor’s degree. For more details about the Professional Program or the Master’s Program, refer to the Texas A&M University Graduate and Professional Catalog or contact the director of the Professional Program in the Department of Accounting.
Faculty

Ahmed, Anwer S, Professor
Accounting
PHD, University of Rochester, 1992

Allen, Natalie L, Senior Lecturer
Accounting
MS, Texas A&M University, 1988

Barrett, Jeannie, Senior Lecturer
Accounting
MBA, Sam Houston State University, 2002

Benjamin, James J, Professor
Accounting
PHD, Indiana University, 1972

Blasor, Tara N, Lecturer
Accounting
MS, Texas A&M University, 2007

Cline, Kayla M, Lecturer
Accounting
MA, Texas A&M University, 2010

Diaz, Michelle C, Clinical Assistant Professor
Accounting
PHD, Texas A&M University, 2005

Ege, Matthew S, Assistant Professor
Accounting
PHD, The University of Texas at Austin, 2013

Farmer, Karen C, Lecturer
Accounting
MS, Texas A&M University, 2009

Flagg, James C, Associate Professor
Accounting
PHD, Texas A&M University, 1988

Foster, Courtney E, Lecturer
Accounting
MS, Texas A&M University, 2008

Garza, Brent, Assistant Professor
Accounting
PHD, University of Illinois at Urbana-Champaign, 2017

Grossman, Steven D, Associate Professor
Accounting
PHD, Tufts University, 1972

Head, Michael J, Lecturer
Accounting
BS, University of Missouri - Columbia, 1980

Hepfer, Bradford F, Assistant Professor
Accounting
PHD, The University of Iowa, 2016

Kinney, Michael R, Associate Professor
Accounting
PHD, University of Arizona, 1990

Knoop, Jacqueline D, Lecturer
Accounting
MS, Texas A&M University, 1997

Larkin, Ryan E, Senior Lecturer
Accounting
MAC, University of Utah, 2002

Lassila, Dennis R, Professor
Accounting
PHD, University of Minnesota, Twin Cities, 1981

Louder, Martha L, Professor
Accounting
PHD, Arizona State University, 1990

McAnally, Mary L, Professor
Accounting
PHD, Stanford University, 2011

McGowan, Annie L, Associate Professor
Accounting
PHD, University of North Texas, 1994

McGuire, Sean T, Associate Professor
Accounting
PHD, University of Georgia, 2008

Moore, Morgan E, Lecturer
Accounting
MAC, The University of Texas at Austin, 2008

Nafstad, April D, Lecturer
Accounting
MS, Texas A&M University, 1997

Ray, Korok, Associate Professor
Accounting
PHD, Stanford Graduate School of Business, 2004

Redman, Karen S, Executive Professor
Accounting
BBA, Texas A&M University, 1980

Rees, Lynn L, Professor
Accounting
PHD, Arizona State University, 1993

Rhodes, Adrienne C, Assistant Professor
Accounting
PHD, The Pennsylvania State University, 2008

Rice, Sarah C, Associate Professor
Accounting
PHD, The Ohio State University, 2007

Roach, Kevin F, Executive Professor
Accounting
BS, State University of New York at Albany, 1973

Robinson, John R, Professor
Accounting
PHD, University of Michigan, 1981
JD, University of Michigan, 1979
Accounting - BBA

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students.
until they complete all requirements listed previously in item 1, at
which time they may apply for admission to an upper-level major field
of study. Transfer students may immediately apply for upper-level
when admitted to Mays Business School if, and only if, they meet all
upper-level requirements at that time.

3. **Change of curriculum students:** Texas A&M students who change
curriculum into Mays Business School from another college or
department at the University will be classified as BUAD (lower-
level Business) students until they complete all requirements listed
previously in item 1. Change of curriculum students who, when
admitted to the business school, qualify to apply for admission to
upper level may do so.

4. Preference for available seats in junior- and senior-level business
courses will be given to students who have been admitted to a degree
granting major in Mays Business School. All ineligible students
who pre-register for upper-level business classes are subject to
cancellation of their registration in these courses.

---

### Program Requirements

#### Lower-Level Business Program (BUAD)

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MATH 140</strong> Mathematics for Business and Social Sciences  (^1)</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)  (^2)</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>COMM 203 Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205 Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243 Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202 Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142 Business Calculus  (^3)</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)  (^2)</td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

---

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229 Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203 Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210 Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206 American National Government  (^2)</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>COMM 203 Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205 Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243 Argumentation and Debate</td>
<td></td>
</tr>
</tbody>
</table>

---

#### Upper-Level Accounting Program

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327 Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>FINC 341 Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321 Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303 Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>International elective  (^1)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 322 Professional Development Seminar – BBA</td>
<td>1</td>
</tr>
<tr>
<td>ACCT 328 Financial Reporting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 329 Cost Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 421 Critical Communication Skills for Accountants  (^2)</td>
<td>2</td>
</tr>
<tr>
<td>MGMT 363 Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364 Operations Management</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td>15</td>
</tr>
</tbody>
</table>
### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 405</td>
<td>Income Tax</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 427</td>
<td>Accounting and Financial Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 212</td>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>General electives</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 407</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>International elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General electives</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

Total Semester Credit Hours: 60

1. Six hours required. A complete list of approved courses is available in the Undergraduate Program Office, Room 238, Wehner Building. In the BBA curricula, the six hours of approved international elective courses simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.

2. This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.

3. General elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.

No more than 33 hours of accounting courses may be applied toward the undergraduate degree.

See Department of Accounting advisors for more information on the requirements to sit for the CPA examination.

Professional Program students will follow the degree plan coordinated by the Professional Program office.

Professional Program students will substitute ACCT 321 to replace 2 hours of General electives.

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### Program Requirements

#### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>International Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 322</td>
<td>Professional Development Seminar – BBA</td>
<td>1</td>
</tr>
<tr>
<td>ACCT 328</td>
<td>Financial Reporting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 329</td>
<td>Cost Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 421</td>
<td>Critical Communication Skills for Accountants</td>
<td>2</td>
</tr>
<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

#### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 405</td>
<td>Income Tax</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 427</td>
<td>Accounting and Financial Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 212</td>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>General Elective</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 407</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>International Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

Total Semester Credit Hours: 36

---

### Fifth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Coursework</td>
<td></td>
<td>36</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 36

Total Semester Credit Hours: 96

1. Six hours required. A complete list of approved courses is available in the Undergraduate Program Office, Room 238, Wehner Building. In the BBA curricula, the six hours of approved international elective courses simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.

2. This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.

3. General elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.
Students will follow the graduate coursework coordinated by the Professional Program office (http://mays.tamu.edu/professional-program/overview).

No more than 33 hours of accounting courses may be applied toward the undergraduate degree.

See Department of Accounting advisors for more information on the requirements to sit for the CPA examination.

Professional Program students will substitute ACCT 321 to replace two hours of General electives.

**Total Program Hours 156**

**Accounting- 5-Year Bachelor of Business Administration/Master of Science**

**Overview**

The Department of Accounting offers a 5-year Bachelor of Business Administration and Master of Science degree program.

**Program Requirements**

**Third Year Accounting Program**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327 Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>FINC 341 Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321 Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303 Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>International elective 1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 322 Professional Development Seminar – BBA</td>
<td>1</td>
</tr>
<tr>
<td>ACCT 328 Financial Reporting II</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 329 Cost Management and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 421 Critical Communication Skills for Accountants</td>
<td>2</td>
</tr>
<tr>
<td>MGMT 363 Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364 Operations Management</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ACCT 405 Income Tax</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 427 Accounting and Financial Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 212 Business Law</td>
<td>3</td>
</tr>
<tr>
<td>General Electives 3</td>
<td>6</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 407 Auditing</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International elective 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General elective 3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fifth Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>Graduate Coursework 4</td>
<td>36</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>36</strong></td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td><strong>96</strong></td>
</tr>
</tbody>
</table>

1 Six hours required. A complete list of approved courses is available in the Undergraduate Program Office, Room 238, Wehner Building. In the BBA curricula, the 6 hours of approved international elective courses simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.

2 This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.

3 General elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.

4 Students will follow the graduate coursework coordinated by the Professional Program office (http://mays.tamu.edu/professional-program/overview).

No more than 33 hours of accounting courses may be applied toward the undergraduate degree.

See Department of Accounting advisors for more information on the requirements to sit for the CPA examination.

Professional Program students will substitute ACCT 321 to replace 2 hours of General electives.

**Total Program Hours 156**

**Energy Accounting - Certificate**

The Certificate in Energy Accounting offers Mays BBA undergraduate students a chance to set themselves apart and find a place in an exciting, competitive industry that provides a wide variety of opportunities – including international experiences. This program is designed to give students high impact learning experiences related to the energy industry.

All requirements for the program must be completed prior to graduation. A certificate notation will be added to the official transcript upon graduation.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 403</td>
<td>Energy Accounting</td>
<td>3</td>
</tr>
<tr>
<td>or ACCT 603 or Energy Accounting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCT 484</td>
<td>Accounting Internship</td>
<td>3</td>
</tr>
<tr>
<td>or FINC 484 or Professional Internship</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Internal Audit - Certificate

The Department of Accounting offers an Internal Audit Certificate.

Program Requirements

Must be BBA or MS in Accounting.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 407</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 408</td>
<td>Internal Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 410</td>
<td>Fraud Examination</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 450</td>
<td>Accounting Ethics 1</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 484</td>
<td>Accounting Internship 1</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

1 May also take ACCT 650 and ACCT 684.

Department of Finance

The business enterprise must raise capital, use it to maximum advantage, and reward investors. Finance is the set of management challenges (and career opportunities) concerned with succeeding at these tasks.

The finance major involves both required and elective courses in three areas. The area of Corporate Finance encompasses tools and techniques for valuing productive assets, choosing ways of funding them, and gauging financial success. In the area of Investments, theoretical and practical models help assess risks and rewards of stocks, bonds, derivatives, and other “financial assets” (individually and in portfolios), as well as the financial health of firms and institutions offering them to the investing public. The area of Markets and Institutions explores the ways in which bankers, brokers, and other financial institutions convert savings into productive capital.

Mays finance graduates with good academic records place well in all these areas, as well as in graduate and professional schools. They work in industry, on Wall Street, in major banking and consulting firms, and as wealth managers. Accordingly, the Department of Finance emphasizes scholarship in its faculty, professionalism in its programs, and innovation in its relationships with employers and mentors.

The Department of Finance offers three certificate programs for BBA business majors. Each program is designed to complement the student’s degree by providing a concentrated course of study and participation in experiential learning opportunities or internships in the selected area.

Faculty

Bouwman, Christa, Associate Professor
Finance
PHD, University of Michigan, 2005

Chen, Yong, Associate Professor
Finance
PHD, Boston College, 2007

Donnell, Cydney C, Executive Professor
Finance
MBA, Southern Methodist University, 1982

Dye, Richard T, Clinical Professor
Finance
PHD, Texas A&M University, 1993

Elmore, Otis E, Senior Lecturer
Finance
JD, The University of Texas at Austin, 1976

Erturk, Bilal, Visiting Assistant Professor
Finance
PHD, Texas A&M University, 2006

Garey, William D, Executive Professor
Finance
MBA, University of Houston - Clear Lake, 1980

Gabriel, Julian, Clinical Professor
Finance
PHD, Georgetown University, 1981

Gilliland, Charles E., Clinical Professor
Finance
PHD, Texas A&M University, 1983

Guyton, Sally C, Senior Lecturer
Finance
MBA, The University of Texas at Austin, 1982

Hallermann, Detlef, Clinical Professor
Finance
PHD, Colorado School of Mines, 1999
Harris IV, T. Britton, Executive Professor  
Finance  
BBA, Texas A&M University, 1980

Hercot, Philippe, Executive Professor  
Finance  
MBA, Harvard Graduate School of Business Administration, 1993

Johnson, Shane A, Professor  
Finance  
PHD, Louisiana State University, 1991

Kim, Hwagyun, Associate Professor  
Finance  
PHD, University of Chicago, 2003

Kolari, James, Professor  
Finance  
PHD, Arizona State University, 1980

Kolasinski, Adam C, Associate Professor  
Finance  
PHD, Massachusetts Institute of Technology, 2006

Liu, Yan, Assistant Professor  
Finance  
PHD, Duke University, 2014

Mahajan, Arvind, Regents Professor  
Finance  
PHD, Georgia State University, 1980

Martindale, Lanny R, Senior Lecturer  
Finance  
JD, South Texas College of Law, 1995  
MBA, Texas A&M University, 1985

McGrath, Karen M, Clinical Assistant Professor  
Finance  
PHD, University of Reading, 2015

Mohseni, Mahdi, Assistant Professor  
Finance  
PHD, Boston College, 2015

Moore, Kevin M, Executive Professor  
Finance  
MS, Johns Hopkins University, 2013  
MS, London School of Economics, 2000  
MBA, The Wharton School, 1994

Peterson, John R, Clinical Assistant Professor  
Finance  
PHD, Texas A&M University, 2002

Rossi, Marco, Assistant Professor  
Finance  
PHD, The Pennsylvania State University, 2010

Skeie, David R, Assistant Professor  
Finance  
PHD, Princeton University, 2004

Soescu, Sorin M, Professor  
Finance  
PHD, University of Florida, 1996

Tebeaux, William J, Executive Professor  
Finance  
MBA, University of Houston, 1971

White, Edward C, Executive Professor  
Finance  
MBA, University of Hawaii, 1972

Wolken, Lawrence C, Senior Professor  
Finance  
PHD, Texas A&M University, 1972

Wu, Wei, Assistant Professor  
Finance  
PHD, University of Chicago, 2015

**Majors**

- Bachelor of Business Administration in Finance (p. 251)

**Certificates**

- Commercial Banking Certificate (p. 253)
- Investment Banking Certificate (p. 253)
- Trading, Risk and Investments Certificate (p. 254)

**Finance - BBA**

**Upper-level Entry Requirements and Application Procedures**

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

Texas A&M University Undergraduate Catalog  251
b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level. **NOTE:** To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. **Transfer students:** Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. **Change of curriculum students:** Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

### Program Requirements

#### Lower-Level Business Program (BUAD)

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>MGMT 211</td>
</tr>
<tr>
<td>POLS 206</td>
</tr>
</tbody>
</table>

Communication:

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>MGMT 211</td>
</tr>
<tr>
<td>POLS 207</td>
</tr>
</tbody>
</table>

Creative arts (p. 24):

Life and physical sciences (p. 22):

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>MGMT 211</td>
</tr>
<tr>
<td>POLS 207</td>
</tr>
</tbody>
</table>

Creative arts (p. 24):

Life and physical sciences (p. 22):

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>MGMT 211</td>
</tr>
<tr>
<td>POLS 207</td>
</tr>
</tbody>
</table>

Creative arts (p. 24):

Life and physical sciences (p. 22):

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>MGMT 211</td>
</tr>
<tr>
<td>POLS 207</td>
</tr>
</tbody>
</table>

Creative arts (p. 24):

Life and physical sciences (p. 22):

<table>
<thead>
<tr>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
</tr>
<tr>
<td>ECON 203</td>
</tr>
<tr>
<td>ISTM 210</td>
</tr>
<tr>
<td>MGMT 211</td>
</tr>
<tr>
<td>POLS 207</td>
</tr>
</tbody>
</table>

Creative arts (p. 24):

Life and physical sciences (p. 22):

Total Semester Credit Hours 60

---

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).

3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

### Management Information Systems

Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

### Business Honors

Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.
Finance: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.

Upper-Level Finance Program

Third Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>FINC 350</td>
<td>Ethics in Financial Decision-Making</td>
<td>1</td>
</tr>
<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>13</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINC 351</td>
<td>Investment Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINC 361</td>
<td>Managerial Finance I</td>
<td>3</td>
</tr>
<tr>
<td>FINC 381</td>
<td>Money and Capital Markets</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>13</td>
</tr>
</tbody>
</table>

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 328</td>
<td>Financial Reporting II</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Finance elective (p. 813)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounting elective (p. 697)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Finance elective (p. 813)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>Finance elective (p. 813)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General elective</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>International elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>60</td>
</tr>
</tbody>
</table>

1 This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.

2 Six hours required. A complete list of approved courses is available in the Undergraduate Advising Office, Room 238, Wehner Building. In the BBA curricula, the 6 hours of approved international elective courses simultaneously fulfill the University's International and Cultural Diversity Graduation requirement.

3 Any 300- or 400-level finance course except FINC 341, FINC 350, FINC 409, and FINC 484.

4 Any 300- or 400-level accounting course except ACCT 315, ACCT 316, ACCT 327, and ACCT 328. Before enrolling in ACCT 489, students should consult with the finance department advisor.

5 Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.

Commercial Banking - Certificate

The Commercial Banking Program (CBP) is designed to equip BBA-Finance students with the banking and finance skills needed to transition into banking careers and serve the personnel needs of banking organizations in the state of Texas and the United States. The program requires completion of prescribed coursework and a paid summer internship with a member bank. Business students must be U.S. citizens or permanent residents.

Students who pursue the CBP must complete all program requirements prior to graduation. A certificate notation will be added to the transcript after graduation.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINC 462</td>
<td>Commercial Bank Management</td>
<td>3</td>
</tr>
<tr>
<td>FINC 463</td>
<td>Seminar in Commercial Banking</td>
<td>3</td>
</tr>
<tr>
<td>FINC 464</td>
<td>Commercial Credit Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FINC 472</td>
<td>Real Estate Finance</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>12</td>
</tr>
</tbody>
</table>

Investment Banking - Certificate

The Investment Banking Program (AOWS iBank) is designed to acquaint BBA-Finance and BBA-Business Honors/Finance undergraduate students with the fundamentals of valuing publicly and privately held firms, underwriting public and private offerings of debt and equity securities, managing capital market risks, complying with SEC (Securities and Exchange Commission) and FINRA (Finance Industry Regulatory Authority) regulations, and managing other financial services commonly offered by investment banks.

Students who pursue the AOWS iBank must complete all program requirements prior to graduation. A certificate notation will be added to the transcript after graduation.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>FINC 443</td>
<td>Valuation</td>
<td>3</td>
</tr>
<tr>
<td>FINC 465</td>
<td>Seminar in Investment Banking</td>
<td>3</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FINC 427</td>
<td>Titans of Investing</td>
<td>6</td>
</tr>
<tr>
<td>FINC 449</td>
<td>Financial Modeling</td>
<td>3</td>
</tr>
<tr>
<td>FINC 466</td>
<td>Wall Street, Investment Banking and the Financial Markets</td>
<td>3</td>
</tr>
<tr>
<td>FINC 489</td>
<td>Special Topics in... (Private Equity)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>
Trading, Risk and Investments - Certificate

The Trading, Risk and Investments Program (TRIP) is designed to prepare BBA-Finance and BBA-Business Honors/Finance undergraduate students in the fields of trading, investments and risk management by combining exceptional class instruction with hands-on internship-based experience. Two paid internships with different board member companies are required. Business students must be U.S. citizens or permanent residents.

Students who pursue TRIP must complete all program requirements prior to graduation. A certificate notation will be added to the transcript after graduation.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 327</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>BUSN 392</td>
<td>Cooperative Education in Business ¹</td>
<td>4</td>
</tr>
<tr>
<td>FINC 368</td>
<td>Trade Floor Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>FINC 485</td>
<td>Directed Studies (Final Presentation)</td>
<td>1</td>
</tr>
</tbody>
</table>

Select three of the following: 9

- FINC 422  Applied Investment Analysis
- FINC 423  Options and Financial Futures
- FINC 424  Trading Risk Management
- FINC 425  Active Portfolio Management
- FINC 427  Titans of Investing
- FINC 428  Fixed Income Analysis
- FINC 443  Valuation
- FINC 446  Technical Analysis of Financial Markets
- FINC 448  Advanced Investments
- FINC 449  Financial Modeling
- FINC 466  Wall Street, Investment Banking and the Financial Markets

Total Semester Credit Hours 20

¹ BUSN 392, a 2-credit course, is repeatable and must be taken two times. This certificate program requires completion of two internships, with BUSN 392 enrollment required during each internship period. A total of 4 credits earned through BUSN 392 enrollment is required.

Department of Information and Operations Management

The Department of Information and Operations Management offers two undergraduate degrees: a BBA degree in Management Information Systems (MISY) and a BBA degree in Supply Chain Management (SCMT). In each degree program, students learn how to use technology to make businesses more efficient, effective, and competitive. Coursework includes both the technical and managerial aspects of MISY and SCMT to ensure that students are well-equipped for successful careers in the dynamic, global business environment.

A list of recommended courses for each degree is available from the Department of Information and Operations Management undergraduate advisors (Room 330, Wehner Building).

Faculty

Abbey, James D, Assistant Professor
Information & Operations Mgmt
PHD, The Pennsylvania State University, 2013

Agrawal, Anupam, Associate Professor
Information & Operations Mgmt
PHD, INSEAD France, 2008

Alexandar Angelus, Assistant Professor
Information & Operations Mgmt
PHD, Stanford University, 1997

Areola-Risa, Antonio, Associate Professor
Information & Operations Mgmt
PHD, Stanford University, 1989

Becker, Aaron C, Clinical Assistant Professor
Information & Operations Mgmt
MS, The Pennsylvania State University, 2000

Boone, Edward F, Lecturer
Information & Operations Mgmt
MBA, University of Delaware, 1994

Curtsinger, Wanda F, Lecturer
Information & Operations Mgmt
PHD, Morehead State University, 2007

Darcey, Louise W, Senior Lecturer
Information & Operations Mgmt
PHD, Texas A&M University, 1974

David Gomillion, Clinical Assistant Professor
Information & Operations Mgmt
PhD, Florida State University, 2013

Geismar, Harry N, Associate Professor
Information & Operations Mgmt
PHD, The University of Texas at Dallas, 2003

Heim, Gregory R, Associate Professor
Information & Operations Mgmt
PHD, University of Minnesota, Twin Cities, 2000

Jamieson, Thomas V, Executive Professor
Information & Operations Mgmt
PHD, Texas A&M University, 1978

Jaspers, Jon L, Clinical Professor
Information & Operations Mgmt
PHD, Florida State University, 1999

Johnson, Robert E, Clinical Associate Professor
Information & Operations Mgmt
PHD, University of Rochester, 1989
Majors

- Bachelor of Business Administration in Management Information Systems  (p. 255)
- Bachelor of Business Administration in Supply Chain Management  (p. 257)

Management Information Systems - BBA

The Management Information Systems major produces graduates who are both business analysts (i.e., professionals who understand accounting, marketing, finance, etc.) and information system specialists (i.e., professionals who can implement information systems strategies). Graduates of the program possess the business, technical, and leadership skills to meet the challenges presented by rapidly evolving information technology and the need to effectively incorporate this technology into business strategy and day-to-day operations.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>
b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level. 

NOTE: To enter upper level in the summer, all requirements must be completed before the beginning of the FIRST SUMMER SESSION.

c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

Program Requirements

Lower-Level Business Program (BUAD)

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences 1</td>
</tr>
<tr>
<td>American history (p. 25) 2</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
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</table>

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</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government 2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>3</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus 3</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25) 2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
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</tr>
<tr>
<td>ISTM 210</td>
<td>Legal and Social Environment of Business</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government 2</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
</tbody>
</table>

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).

3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

Management Information Systems: Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

Business Honors: Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.
Finance: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.

Management Information Systems Program

Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTM 281</td>
<td>Professional Development Information Systems Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ISTM 310</td>
<td>Network Communications and Infrastructure</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 320</td>
<td>Business Systems Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTM 315</td>
<td>Database Programming</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 410</td>
<td>Management of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 481</td>
<td>Information Systems Seminar</td>
<td>1</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
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</tr>
<tr>
<td>International elective</td>
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<td></td>
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</table>

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 415</td>
<td>Information Systems Capstone Project</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 481</td>
<td>Information Systems Seminar</td>
<td>1</td>
</tr>
<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>Misy Directed elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>Misy Directed elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>International elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>60</td>
</tr>
</tbody>
</table>

Supply Chain Management - BBA

The Supply Chain Management major prepares students for careers in designing and managing the activities that deliver products and services to customers. Supply chain activities add direct value to the customer and thus, are extremely valuable to firms. This major produces graduates with strong analytical and problem-solving skills and the ability to work in and coordinate team activities. Graduates possess the business, technical, and leadership skills needed to meet the challenges of the rapidly evolving global marketplace.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
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<tr>
<td>ECON 202</td>
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<td>MATH 140</td>
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</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

1. ISTM 281 and ISTM 481 are cross-listed courses. Students must take three semesters of ISTM 281/481 for a total of three credits.
2. This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.
3. A complete list of approved courses is available in the Undergraduate Advising Office, 238 Wehner Building. The six required hours simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.
4. Select in consultation with a management information systems (MISY) academic advisor. A list of acceptable courses is available in the department academic advising office, 330 Wehner.
5. Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.
## Program Requirements

### Lower-Level Business Program (BUAD)

#### First Year

**Fall**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
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<td></td>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
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<td>COMM 203 Public Speaking</td>
<td></td>
</tr>
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<tr>
<td></td>
<td>COMM 243 Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ENGL 104 Composition and Rhetoric</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences (p. 22)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social and behavioral sciences (p. 25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

**Spring**

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
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#### Second Year

**Fall**

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<td>POLS 206</td>
<td>American National Government</td>
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<td></td>
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<tr>
<td></td>
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**Spring**

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<td></td>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.
2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).
3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

### Management Information Systems

Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

### Business Honors

Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

### Finance

Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.
Upper-Level Supply Chain Management Program

Third Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing 1</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>General elective 2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 340</td>
<td>Global Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 361</td>
<td>Operations Planning and Control</td>
<td>3</td>
</tr>
<tr>
<td>SCMT Directed elective (p. 955) 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>International elective 4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td></td>
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</tbody>
</table>

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCMT 300/</td>
<td>Business Communications 1 1</td>
<td>1</td>
</tr>
<tr>
<td>ISYS 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCMT 335</td>
<td>Sourcing and Procurement</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 345</td>
<td>Business Process Design</td>
<td>3</td>
</tr>
<tr>
<td>SCMT Directed elective (p. 955) 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General elective 2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 465</td>
<td>Information Technology for Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SCMT Directed elective (p. 955) 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General elective 2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>International elective 4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

1 This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.
2 Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.
3 Select in consultation with a supply chain management academic advisor. A list of acceptable courses is available in the department academic advising office, 330 Wehner.
4 A complete list of approved courses is available in the Undergraduate Advising Office, 238 Wehner Building. The six required hours simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.

Department of Management

The BBA in Management offers a broad range of career opportunities. A management student develops the ability to plan, organize, make decisions, communicate, and lead effectively in a variety of work settings. Written and verbal communication, teamwork, and problem solving are emphasized.

Management majors pursue a specialization, also called directed elective track, that allows for a focused area of study in one of the five following areas.

- **Consulting and General Management** - This track will appeal to students interested in problem-solving and helping individuals or organizations as they maneuver the business environment, whether the student anticipates working in the consulting industry or in any managerial role.
- **Entrepreneurial Leadership** - Designed for students interested in learning the entrepreneurial process, the role of creativity in identifying and/or developing entrepreneurial opportunities, the elements of a business plan, and the leadership practices associated with successful organizations.
- **Human Resource Management** - A career in human resources allows HR professionals to engage in the strategic management of an organization’s human capital. Students in this track will learn how HR professionals develop and implement workplace policies and initiatives regarding employee recruiting, selection, compensation, training & development, performance management, career planning, and employee & labor relations.
- **Nonprofit Management** - For students seeking to invest themselves in a mission beyond profit-making and into the realm of social change for charitable, educational, religious, scientific, and other “public good” causes and organizations.
- **Pre-Law** - This track will expose students to opportunities that combine law and business, and could include careers in corporate law, international affairs, public policy, and conflict resolution, to name a few. Many students in this track will pursue a law or other advanced degree.

Combining theory and application both inside and outside the classroom allows the student to obtain the knowledge and competencies sought by and readily applied in organizations such as consulting firms, Fortune 500 companies, retail and services industries, nonprofit and charitable entities, governmental agencies, new ventures, and family businesses.

The Management major allows the student to select from a variety of jobs, organizations and industries within the student’s specialization or more broadly in management. It also provides a solid foundation for pursuing graduate studies in business, law, and a variety of other disciplines.

Faculty

Barrick, Murray R, Distinguished Professor
Management
PHD, University of Akron, 1988

Bierman, Leonard, Professor
Management
MA, University of California, Los Angeles, 1980
JD, University of Pennsylvania School of Law, 1978
Boivie, Steven R, Associate Professor
Management
PHD, The University of Texas at Austin, 2006

Boswell, Wendy R, Professor
Management
PHD, Cornell University, 2000

Buenger, Victoria L, Clinical Professor
Management
PHD, Texas A&M University, 1990

Call, Matthew L, Assistant Professor
Management
PHD, University of South Carolina, 2016

Cannella, Albert A, Professor
Management
PHD, Columbia University, 1991

Chandler, Ronald S, Executive Professor
Management
MS, Texas A&M University, 2001

Courtright, Stephen H, Associate Professor
Management
PHD, University of Iowa, 2012

Deshong, Tery D, Executive Professor
Management
JD, The University of Tulsa, 1991

Devers, Cynthia E, Associate Professor
Management
PHD, Michigan State University, 2003

Dwivedi, Priyanka, Assistant Professor
Management
PHD, The Pennsylvania State University, 2017

Eden, Lorraine A, Professor
Management
PHD, Dalhousie University, Canada, 1976

Elmore, Otis E, Senior Lecturer
Management
JD, The University of Texas at Austin, 1976

Flint, Gerald D, Clinical Professor
Management
PHD, Texas A&M University, 1997

Griffin, Ricky W, Distinguished Professor
Management
PHD, University of Houston, 1978

Hailey, Camille E, Senior Lecturer
Management
JD, South Texas College of Law, 1993

Howard, Michael D, Assistant Professor
Management
PHD, University of Washington, 2012

Ireland, Robert D, Distinguished Professor
Management
PHD, Texas Tech University, 1977

King-Metters, Kathryn H, Executive Professor
Management
PHD, Capella University, 2007

Koopman, Joel, Assistant Professor
Management
PHD, Michigan State University, 2014

Koufteros, Beth A, Senior Lecturer
Management
MOD, Bowling Green State University, 1992

Lester, Richard H, Clinical Professor
Management
PHD, Texas A&M University, 2003

Lewis, Donald H, Executive Professor
Management
MBA, Texas A&M International University, 1992

Mahajan, Vanita, Senior Lecturer
Management
MBA, Texas A&M University, 1986

Paetzold, Ramona L, Professor
Management
JD, Indiana University, 1990
PHD, Indiana University, 1979

Panina, Daria, Clinical Associate Professor
Management
PHD, Rutgers, The State University of New Jersey, 2002

Pustay, Michael W, Professor
Management
PHD, Yale University, 1973

Schleicher, Deidra J, Associate Professor
Management
PHD, The Pennsylvania State University, 1998

Shetty, Bharathi S, Lecturer
Management
MS, Texas A&M University, 2009

Swim, Keith D, Clinical Associate Professor
Management
JD, Texas Tech University, 1980

Tihanyi, Laszlo, Professor
Management
PHD, Indiana University, 1996

Watt, John D, Clinical Associate Professor
Management
PHD, Kansas State University, 2002

Welch, Ben D, Clinical Professor
Management
PHD, Texas A&M University, 1990
Majors

- Bachelor of Business Administration in Management, Consulting/General Management Track (p. 261)
- Bachelor of Business Administration in Management, Entrepreneurial Leadership Track (p. 263)
- Bachelor of Business Administration in Management, Human Resource Management Track (p. 265)
- Bachelor of Business Administration in Management, Nonprofit Management Track (p. 267)
- Bachelor of Business Administration in Management, Pre-Law Track (p. 269)

Certificates

- Entrepreneurial Leadership Certificate (p. 271)

Management - BBA, Consulting/General Management Track

The BBA in Management offers five specializations, or tracks, that provide academic focus and career direction for student interests.

The Consulting and General Management track will appeal to students interested in problem-solving and helping individuals or organizations as they maneuver the business environment, whether the student anticipates working in the consulting industry or in any managerial role.

BUAD students expecting to declare their upper level major in Management with the Consulting/General Management track will meet the following requirements.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.
   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

   d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when
admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

Program Requirements

Lower-Level Business Program (BUAD)

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140 Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>COMM 203 Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205 Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243 Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202 Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142 Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
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Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ACCT 229 Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203 Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210 Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206 American National Government</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>COMM 203 Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205 Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243 Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
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</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230 Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211 Legal and Social Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207 State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
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</table>

Upper-Level Management Program

Third Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 322 or ECON 323</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 363 Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321 Marketing</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 303 Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>International elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINC 341 Business Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 373 Managing Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 422 Management Consulting</td>
<td>3</td>
</tr>
<tr>
<td>SCMT 364 Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>General elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 372 Advanced Concepts in Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 424 Organizational Design, Change and Development</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 439 Negotiations</td>
<td>3</td>
</tr>
<tr>
<td>Business elective</td>
<td>3</td>
</tr>
<tr>
<td>Data analysis elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

Life and physical sciences (p. 22) | 3 |

Semester Credit Hours | 15 |

Total Semester Credit Hours | 60 |

1 MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

2 For those students under ROTC contract, see Requirement 7 of the “Requirements for a Baccalaureate Degree” (p. 27).

3 MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

Management Information Systems: Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

Business Honors: Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

Finance: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower level). The general elective taken in the senior year can be reduced by 1 credit.
Management - BBA, Entrepreneurial Leadership Track

The BBA in Management offers five specializations, or tracks, that provide academic focus and career direction for student interests.

The Entrepreneurial Leadership track is designed for students interested in learning the entrepreneurial process, the role of creativity in identifying and/or developing entrepreneurial opportunities, the elements of a business plan, and the leadership practices associated with successful organizations.

BUAD students expecting to declare their upper level major in Management with the Entrepreneurial Leadership track will meet the following requirements.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

   d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field.
of study. Transfer students may immediately apply for upper-level
when admitted to Mays Business School if, and only if, they meet all
upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change
curriculum into Mays Business School from another college or
department at the University will be classified as BUAD (lower-
level Business) students until they complete all requirements listed
previously in item 1. Change of curriculum students who, when
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upper level may do so.

4. Preference for available seats in junior- and senior-level business
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Program Requirements

Lower-Level Business Program (BUAD)

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences ¹</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25) ²</td>
<td>3</td>
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<tr>
<td>Communication</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
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<tr>
<td>MGMT 439</td>
<td>Negotiations</td>
<td>3</td>
</tr>
<tr>
<td>MGMT directed electives ³</td>
<td>6</td>
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</tbody>
</table>

MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

1. For those students under ROTC contract, see Requirement 7 of the
“Requirements for a Baccalaureate Degree” (p. 27).

2. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

Management Information Systems: Students intending to major in
Management Information Systems must add ISTM 250 Business
Programming Logic and Design (3 credits) to sophomore year curriculum
in Business (lower level). The creative arts elective or a communication
elective can be taken during the junior year.

Business Honors: Students admitted to Business Honors must add
(1) BUSN 125 Business Learning Community I (3 credits) to the freshman
year curriculum and (2) BUSN 225 Business Competency (3 credits) to
the sophomore year curriculum in Business (lower level). The creative
arts elective or a communication elective can be taken during the junior year.

Finance: Students intending to major in Finance must add FINC 210 to
freshman year curriculum in Business (lower level). The general elective
taken in the senior year can be reduced by 1 credit.
Management - BBA, Human Resource Management Track

The BBA in Management offers five specializations, or tracks, that provide academic focus and career direction for student interests.

A career in human resources allows HR professionals to engage in the strategic management of an organization’s human capital. Students in the Human Resource Management track will learn how HR professionals develop and implement workplace policies and initiatives regarding employee recruiting, selection, compensation, training & development, performance management, career planning, and employee & labor relations.

BUAD students expecting to declare their upper level major in Management with the Human Resource Management track will meet the following requirements.

### Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

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   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

   **NOTE:** To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. **Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester,** unless satisfactorily completed prior to upper-level entry:

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<td>Legal and Social Environment of Business</td>
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</table>

   d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. **Transfer students:** Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field.

### Course Requirements

#### Spring

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<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MGMT 466 Strategic Management</td>
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<td>MGMT directed elective</td>
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<td>International elective</td>
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<td>General electives</td>
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<tr>
<td>Business elective</td>
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<tr>
<td>Data analysis elective</td>
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<td>Semester Credit Hours</td>
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</tbody>
</table>

#### Total Semester Credit Hours

60
of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. **Change of curriculum students**: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

## Program Requirements

### Lower-Level Business Program (BUAD)

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<tr>
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<td>Introductory Accounting</td>
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### Upper-Level Management Program

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<tr>
<td>Fall</td>
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Management - BBA, Nonprofit Management Track

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b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

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2. **Transfer students**: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

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### Program Requirements

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<td>Social and behavioral sciences (p. 25)</td>
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<td><strong>Semester Credit Hours</strong></td>
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<tr>
<td>Spring</td>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
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<td></td>
<td>MATH 142</td>
<td>Business Calculus 3</td>
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<td>American history (p. 25) 2</td>
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<td></td>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
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<td></td>
<td>Life and physical sciences (p. 22)</td>
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<td><strong>Semester Credit Hours</strong></td>
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**Second Year**

<table>
<thead>
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<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
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<tr>
<td></td>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
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<tr>
<td></td>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
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<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government 2</td>
<td>3</td>
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<tr>
<td></td>
<td>Communication</td>
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<tr>
<td></td>
<td>COMM 203</td>
<td>Public Speaking</td>
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#### Upper-Level Management Program

**Third Year**

<table>
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<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ECON 322 or ECON 323</td>
<td>Applied Microeconomic Theory or Microeconomic Theory</td>
<td>3</td>
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<td></td>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
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<td></td>
<td>MKTG 321</td>
<td>Marketing 1</td>
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<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
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<td></td>
<td>International elective 2</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td>15</td>
<td></td>
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<tr>
<td>Spring</td>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
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<td></td>
<td>MGMT 373</td>
<td>Managing Human Resources 1</td>
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<td>MGMT 432</td>
<td>Managing the Nonprofit Organization 3</td>
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<td>SCMT 364</td>
<td>Operations Management</td>
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<td>General elective 4</td>
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<td></td>
<td><strong>Semester Credit Hours</strong></td>
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1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree." (p. 27).

3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

### Management Information Systems

Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

### Business Honors

Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

### Finance

Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.
Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:
      
      | Code       | Title                        | Semester Credit Hours |
      |------------|------------------------------|-----------------------|
      | ACCT 229   | Introductory Accounting      | 3                     |
      | ECON 202   | Principles of Economics      | 3                     |
      | ECON 203   | Principles of Economics      | 3                     |
      | MATH 140   | Mathematics for Business and | 3                     |
      |            | Social Sciences              |                       |
      | MATH 142   | Business Calculus (or its    | 3                     |
      |            | equivalent)                  |                       |
   
   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.  
   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.
   
   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:
      
      | Code       | Title                        | Semester Credit Hours |
      |------------|------------------------------|-----------------------|
      | ACCT 230   | Introductory Accounting      | 3                     |
      | ISTM 210   | Fundamentals of Information  | 3                     |
      |            | Systems                      |                       |
      | MGMT 211   | Legal and Social Environment | 3                     |
      |            | of Business                  |                       |
   
   d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field

Management - BBA, Pre-Law Track

The BBA in Management offers five specializations, or tracks, that provide academic focus and career direction for student interests.

The Pre-Law track will expose students to opportunities that combine law and business, and could include careers in corporate law, international affairs, public policy, and conflict resolution, to name a few. Many students in this track will pursue a law or other advanced degree.

BUAD students expecting to declare their upper level major in Management with the Pre-Law track will meet the following requirements.

**Management - BBA, Pre-Law Track**

The BBA in Management offers five specializations, or tracks, that provide academic focus and career direction for student interests.

The Pre-Law track will expose students to opportunities that combine law and business, and could include careers in corporate law, international affairs, public policy, and conflict resolution, to name a few. Many students in this track will pursue a law or other advanced degree.

BUAD students expecting to declare their upper level major in Management with the Pre-Law track will meet the following requirements.
of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

Program Requirements

Lower-Level Business Program (BUAD)

First Year

Fall

<table>
<thead>
<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
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<td>American history (p. 25)</td>
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<td>Communication</td>
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<tr>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
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<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
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Second Year

Fall

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ACCT 229</td>
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<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
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<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
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</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>Communication</td>
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<td></td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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Upper-Level Management Program

Third Year

Fall

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ECON 322 or ECON 323</td>
<td>Applied Microeconomic Theory or Microeconomic Theory</td>
<td>3</td>
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<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
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<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
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<td>International elective</td>
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Spring

<table>
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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
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<td>MGMT 373</td>
<td>Managing Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 450/IBUS 450</td>
<td>International Environment of Business</td>
<td>2</td>
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<td>SCMT 364</td>
<td>Operations Management</td>
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Fourth Year

Fall

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<td>MGMT directed electives</td>
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</table>

Management Information Systems: Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

Business Honors: Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

Finance: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.

Requirements for a Baccalaureate Degree:

For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).

3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.
Entrepreneurial Leadership - Certificate

The Certificate in Entrepreneurial Leadership offers Mays Business School students seeking a BBA or BS (Agribusiness) degree the opportunity to study entrepreneurship in a focused set of courses.

Designed to develop competencies needed to successfully create and manage new ventures or to be a driver of innovation within existing enterprises, emphasis is placed on leadership in three areas: conceiving, exploiting, and managing opportunities. Graduates of this program are provided with the tools to plan for new business start-ups, to become leaders in high growth firms, or to become corporate “intrapreneurs” capable of improving an organization’s ability to innovate.

Students who pursue the Certificate in Entrepreneurial Leadership must complete all program requirements prior to graduation.
Faculty

Berry, Leonard L, Distinguished Professor
Marketing
PHD, Arizona State University, 1968

Bridges, Cheryl H, Adjunct Professor
Marketing
BS, Texas Woman's University, 1968

Busch, Paul S, Professor
Marketing
PHD, The Pennsylvania State University, 1974

Cai, Cexun, Assistant Professor
Marketing
PHD, University of Pennsylvania (The Wharton School), 2015

Hollinger, Kelli, Lecturer
Marketing
MA, Texas A&M University, 2002

Houston, Mark B, Professor
Marketing
PHD, Arizona State University, 1995

Jones, Eli, Professor
Marketing
PHD, Texas A&M University, 1997

Kan, Christina S, Assistant Professor
Marketing
PHD, University of Colorado-Boulder, 2015

Lampo, Sandra S, Clinical Associate Professor
Marketing
PHD, Texas A&M University, 2001

Liu, Yan, Associate Professor
Marketing
PHD, Purdue University, 2010

Loring, Andrew J, Lecturer
Marketing
MS, University of Maine, 2012

McDaniel, Stephen W, Professor
Marketing
PHD, University of Arkansas, 1979

Mittal, Chiraag, Assistant Professor
Marketing
PHD, University of Minnesota, Twin Cities, 2016

Molhusen, Brian E, Executive Professor
Marketing
BBA, Texas A&M University, 1978

Parish, Janet T, Clinical Professor
Marketing
PHD, The University of Alabama, 2002

Pride, William M, Professor
Marketing
PHD, Louisiana State University, 1972

Ramanathan, Suresh, Professor
Marketing
PHD, New York University, 2002

Seipp, Leslie S, Senior Lecturer
Marketing
MBA, Rice University, 2008

Shankar, Venkatesh, Professor
Marketing
PHD, Northwestern University, 1995

Sorescu, Alina, Professor
Marketing
PHD, University of Houston, 2002

Sreenivasan, Akshaya, Lecturer
Marketing
PHD, The Pennsylvania State University, 2016

Sridhar, Shrihari, Associate Professor
Marketing
PHD, University of Missouri - Columbia, 2009

Troy, Alesia C, Clinical Professor
Marketing
PHD, Texas A&M University, 1997

Varadarajan, Poondi, Distinguished Professor
Marketing
PHD, University of Massachusetts Amherst, 1979

Yadav, Manjit S, Professor
Marketing
PHD, Virginia Polytechnic Institute and State University, 1990

Zimmer, Mary R, Clinical Associate Professor
Marketing
PHD, The University of Texas at Austin, 1985

Majors

• Bachelor of Business Administration in Marketing, Advertising Strategy Track (p. 273)
• Bachelor of Business Administration in Marketing, Analytics and Consulting Track (p. 275)
• Bachelor of Business Administration in Marketing, Professional Selling and Sales Management Track (p. 277)
• Bachelor of Business Administration in Marketing, Retail Buying and Management Track (p. 279)

Certificates

• Advertising Strategy Certificate (p. 281)
• Analytics and Consulting Certificate (http://catalog.tamu.edu/undergraduate/business/marketing/analytics-consulting-certificate)
• Professional Selling and Sales Management Certificate (p. 282)
• Retail Buying and Management Certificate (p. 282)
Marketing - BBA, Advertising Strategy Track

The Department of Marketing offers students interested in advertising several opportunities for building skills specific to that career, and for networking with advertising professionals. In addition to taking advertising courses, students can attend professional conferences, participate in local, regional, and national advertising campaign competitions, and tour top advertising agencies.

The Advertising Strategy track supplements their degree by tailoring directed elective courses and building specific advertising skills. It also provides recruiters a means of identifying top students interested in advertising.

Students who complete the Advertising Strategy track are well-prepared for careers in advertising account services or brand management, or they may choose to specialize in related areas such as media planning, social and digital media, or public relations.

BUAD students expecting to declare their upper level major in Marketing with the Advertising Strategy track must meet the following requirements.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:
      
      | Code   | Title                                      | Semester Credit Hours |
      |--------|--------------------------------------------|-----------------------|
      | ACCT 229 | Introductory Accounting                   | 3                     |
      | ECON 202 | Principles of Economics                   | 3                     |
      | ECON 203 | Principles of Economics                   | 3                     |
      | MATH 140 | Mathematics for Business and Social Sciences | 3                     |
      | MATH 142 | Business Calculus (or its equivalent)     | 3                     |

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

   **NOTE:** To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

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Program Requirements

Lower-Level Business Program (BUAD)

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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
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<tr>
<td>American history (p. 25)</td>
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<td>3</td>
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<tr>
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<td></td>
<td>3</td>
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<tr>
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</tr>
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<tr>
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<td>Composition and Rhetoric</td>
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<tr>
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<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
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</table>
### Social and behavioral sciences (p. 25)

| Semester Credit Hours | 3 |

### Spring

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<th>Course</th>
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<tr>
<td>ECON 202</td>
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<td>MATH 142</td>
<td>Business Calculus</td>
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#### Fall

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<th>Course</th>
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<td>Fundamentals of Information Systems</td>
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</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>2</td>
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#### Communication

Select one of the following:

- COMM 203 | Public Speaking | 3 |
- COMM 205 | Communication for Technical Professions | 3 |
- COMM 243 | Argumentation and Debate | 3 |
- ENGL 104 | Composition and Rhetoric | 3 |

| Semester Credit Hours | 15 |

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>2</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>60</td>
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</tr>
</tbody>
</table>

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.
2. For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).
3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

### Management Information Systems:

Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

### Business Honors:

Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

### Finance:

Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.

### Upper-Level Marketing Program

<table>
<thead>
<tr>
<th>Third Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>FINC 341</td>
</tr>
<tr>
<td>MGMT 363</td>
</tr>
<tr>
<td>MKTG 321</td>
</tr>
<tr>
<td>MKTG 404</td>
</tr>
<tr>
<td>SCMT 303</td>
</tr>
<tr>
<td>General elective</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 322</td>
<td>Consumer Behavior</td>
</tr>
<tr>
<td>MKTG 323</td>
<td>Marketing Research</td>
</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
</tr>
<tr>
<td>Directed elective</td>
<td>3</td>
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<tr>
<td>International elective</td>
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<td>Semester Credit Hours</td>
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### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>Marketing elective (p. 898)</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Directed elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Directed elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>International elective</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
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</tbody>
</table>

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 448</td>
<td>Marketing Strategy</td>
<td>1</td>
</tr>
<tr>
<td>Marketing elective (p. 898)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Directed elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

1. This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.
2. Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.
3. Twelve hours required. Select from MKTG 345, MKTG 347, MKTG 445, MKTG 447 and MKTG 442.
4. Six hours required. A complete list of approved courses is available in the Undergraduate Advising Office, 238 Wehner Building. The six hours of approved international elective courses simultaneously fulfill the University's International and Cultural Diversity Graduation requirement.
5. Six hours required. Any MKTG course (except required MKTG courses and MKTG 409) and IBUS 401-IBUS 403 (p. 848). A maximum of 6 hours of MKTG 402/IBUS 402, MKTG 403/IBUS 403, MKTG 484, MKTG 485, BUSN 392 may be used.
Marketing - BBA, Analytics and Consulting Track

The Analytics and Consulting track complements the student’s degree and provides tangible evidence of rigorous academic and experiential preparation for a career in analytics or consulting. The curriculum emphasizes marketing analytics and marketing consulting as well as a consulting project in corporate social responsibility.

Students who complete this track can work in marketing analytics or consulting positions for marketing, information systems, or organizational structure.

BUAD students expecting to declare their upper level major in Marketing with the Analytics and Consulting track must meet the following requirements.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 230</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
</tbody>
</table>

d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

Program Requirements

Lower-Level Business Program (BUAD)

First Year

Fall

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25) ¹</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
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</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>
### Upper-Level Marketing Program

- **MATH 142**: Business Calculus \(^3\) 3
- **American history (p. 25)** \(^2\) 3
- **Language, philosophy and culture (p. 23)** 3
- **Life and physical sciences (p. 22)** 3

| Semester Credit Hours | 15 |

#### Second Year

**Fall**

- **ACCT 229**: Introductory Accounting 3
- **ECON 203**: Principles of Economics 3
- **ISTM 210**: Fundamentals of Information Systems 3
- **POLS 206**: American National Government \(^2\) 3

<table>
<thead>
<tr>
<th>Communication 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMM 203</strong>: Public Speaking 3</td>
<td></td>
</tr>
<tr>
<td><strong>COMM 205</strong>: Communication for Technical Professions 3</td>
<td></td>
</tr>
<tr>
<td><strong>COMM 243</strong>: Argumentation and Debate 3</td>
<td></td>
</tr>
<tr>
<td><strong>ENGL 104</strong>: Composition and Rhetoric 3</td>
<td></td>
</tr>
</tbody>
</table>

| Semester Credit Hours | 15 |

**Spring**

- **ACCT 230**: Introduction to Financial Accounting 3
- **MGMT 211**: Legal and Social Environment of Business 3
- **POLS 207**: State and Local Government \(^2\) 3
- **Creative arts (p. 24)** 3
- **Life and physical sciences (p. 22)** 3

| Semester Credit Hours | 15 |

| Total Semester Credit Hours | 60 |

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.
2. For those students under ROTC contract, see Requirement 7 of the “Requirements for a Baccalaureate Degree” (p. 27).
3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

### Management Information Systems

Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

### Business Honors

Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community 1 (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

### Finance

Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower level). The general elective taken in the senior year can be reduced by 1 credit.

### Third Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>FINC 341</td>
<td>Business Finance</td>
<td>3</td>
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<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 321</td>
<td>Marketing</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 404</td>
<td>Advanced Excel for Marketing Managers</td>
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</tr>
<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td><strong>General elective</strong> (^2)</td>
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<td>2</td>
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</tbody>
</table>

| Semester Credit Hours | 15 |

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 322</td>
<td>Consumer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 323</td>
<td>Marketing Research</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 430</td>
<td>Marketing Consulting (^3)</td>
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</tr>
<tr>
<td>SCMT 364</td>
<td>Operations Management</td>
<td>3</td>
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<tr>
<td><strong>International elective</strong> (^4)</td>
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</tr>
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</table>

| Semester Credit Hours | 15 |

### Fourth Year

**Fall**

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<thead>
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<th>Title</th>
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<tbody>
<tr>
<td>MKTG 431</td>
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<tr>
<td>Marketing elective (p. 898) (^5)</td>
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<tr>
<td>Marketing elective (p. 898) (^5)</td>
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<td>3</td>
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<tr>
<td><strong>General elective</strong> (^2)</td>
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</tr>
<tr>
<td><strong>International elective</strong> (^4)</td>
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<td>3</td>
</tr>
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</table>

| Semester Credit Hours | 15 |

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 466</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 448</td>
<td>Marketing Strategy (^1)</td>
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</tr>
<tr>
<td>MKTG 432</td>
<td>Corporate Social Responsibility (^3)</td>
<td>3</td>
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<tr>
<td>Marketing elective (p. 898) (^5)</td>
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<td>3</td>
</tr>
<tr>
<td><strong>General elective</strong> (^2)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

| Semester Credit Hours | 15 |

| Total Semester Credit Hours | 60 |

---

1. This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.
2. For those students under ROTC contract, see Requirement 7 of the “Requirements for a Baccalaureate Degree” (p. 27).
3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.
4. Six hours required. A complete list of approved courses is available in the Undergraduate Advising Office, 238 Wehnner Building. The six hours of approved international elective courses simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.
5. Nine hours required. Any MKTG course (except required MKTG courses and MKTG 409) and IBUS 401-IBUS 403 (p. 848). A maximum of 6 hours of MKTG 402/IBUS 402, MKTG 403/IBUS 403, MKTG 484, MKTG 485, BUSN 392 may be used.
Marketing - BBA, Professional Selling and Sales Management Track

Students who are looking to expand their communication and relationship building skills should consider the Professional Selling and Sales Management track. Students in this program will take four sales-related directed electives that provide real world scenarios and role-plays which help them build skills that are critical for a successful career in sales and marketing.

Upon graduating in the sales track, students will have enhanced their interpersonal communication skills in a business environment which gives them a distinct advantage in the job market regardless of the planned career path.

BUAD students expecting to declare their upper level major in Marketing with the Professional Selling and Sales Management track must meet the following requirements.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.

   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

Program Requirements

Lower-Level Business Program (BUAD)

First Year

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25) 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>
Management Information Systems: Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business. Students intending to major in Information Systems must add one of the following courses (3 credits): ISTM 250 Business Programming Logic and Design, MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.

Business Honors: Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business. The creative arts elective and a communication elective can be taken during the junior year.

Finance: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business. The general elective taken in the senior year can be reduced by 1 credit.

Upper-Level Marketing Program

<table>
<thead>
<tr>
<th>MATH 142</th>
<th>Business Calculus ³</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>American history (p. 25) ²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Second Year

**Fall**

| ACCT 229 | Introductory Accounting | 3 |
| ECON 203 | Principles of Economics | 3 |
| ISTM 210 | Fundamentals of Information Systems | 3 |
| POLS 206 | American National Government ² | 3 |
| Communication | | 3 |
| Select one of the following: | | |
| COMM 203 | Public Speaking | |
| COMM 205 | Communication for Technical Professions | |
| COMM 243 | Argumentation and Debate | |
| ENGL 104 | Composition and Rhetoric | |
| Semester Credit Hours | 15 |

**Spring**

| ACCT 230 | Introductory Accounting | 3 |
| MGMT 211 | Legal and Social Environment of Business | 3 |
| POLS 207 | State and Local Government ² | 3 |
| Creative arts (p. 24) | 3 |
| Life and physical sciences (p. 22) | 3 |
| Semester Credit Hours | 15 |

Total Semester Credit Hours 60

1. MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.
2. For those students under ROTC contract, see Requirement 7 of the “Requirements for a Baccalaureate Degree” (p. 27).
3. MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

**Third Year**

| FINC 341 | Business Finance | 3 |
| MGMT 363 | Managing People in Organizations | 3 |
| MKTG 321 | Marketing ¹ | 3 |
| MKTG 404 | Advanced Excel for Marketing Managers | 1 |
| SCMT 303 | Statistical Methods | 3 |
| General elective ² | 2 |
| Semester Credit Hours | 15 |

**Spring**

| MKTG 322 | Consumer Behavior | 3 |
| MKTG 323 | Marketing Research | 3 |
| SCMT 364 | Operations Management | 3 |
| Directed Elective ³ | 3 |
| International elective ⁴ | 3 |
| Semester Credit Hours | 15 |

Fourth Year

**Fall**

| Marketing elective (p. 898) ⁵ | 3 |
| Directed elective ³ | 3 |
| Directed elective ³ | 3 |
| General elective ² | 3 |
| International elective ⁴ | 3 |
| Semester Credit Hours | 15 |

| MGMT 466 | Strategic Management | 3 |
| MKTG 448 | Marketing Strategy ¹ | 3 |
| Marketing elective (p. 898) ⁵ | 3 |
| Directed elective ³ | 3 |
| General elective ² | 3 |
| Semester Credit Hours | 15 |

Total Semester Credit Hours 60

1. This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.
2. Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MKTG 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis.
3. Twelve hours required. Select from MKTG 335, MKTG 347, MKTG 489, MKTG 435 and MKTG 436.
4. Six hours required. A maximum of 6 hours of approved international elective courses simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.
5. Six hours required. Any MKTG course (except required MKTG courses and MKTG 409) and IBUS 401-IBUS 403 (p. 848). A maximum of 6 hours of approved international elective courses simultaneously fulfill the University’s International and Cultural Diversity Graduation requirement.

For those students under ROTC contract, see Requirement 7 of the “Requirements for a Baccalaureate Degree” (p. 27).
Marketing - BBA, Retail Buying and Management Track

The Center for Retailing Studies is a nationally known and respected center that is part of the Department of Marketing in Mays Business School at Texas A&M University. The Center is a bridge between the academic and business community, and serves students, faculty, and partner firms in a variety of ways, one of which is the Retail Buying and Management track of the BBA in Marketing.

The Retail Buying and Management track requires four retailing related directed electives. Graduates who complete this track are well equipped for exciting careers in management, merchandising, retail financial planning, and marketing. Completion of the program provides tangible evidence of commitment to and expertise in retailing.

BUAD students expecting to declare their upper-level major in Marketing with the Retail Buying and Management track must meet the following requirements.

Upper-level Entry Requirements and Application Procedures

Students who meet the University and college entrance requirements enter Mays Business School in the BUAD (lower-level business) classification. Enrollment of Mays Business School students in junior- and senior-level business courses is limited to those who have been admitted to upper-level (also referred to as upper division) in one of the seven majors (B.B.A.: accounting, business honors, finance, management, management information systems, marketing, and supply chain management) in the college.

The B.B.A. (accounting, business honors, finance, management, management information systems, marketing, and supply chain management) upper-level entry requirements and application procedures are as follows:

1. To be admitted to an upper-level major, a student must be admitted to Mays Business School and have:
   a. Satisfactorily completed the following five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 229</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus (or its equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

   b. BUAD students apply for upper level no later than the last class day of the semester before they expect to enter upper level.
   NOTE: To enter upper level in the summer, all requirements must be completed BEFORE the beginning of the FIRST SUMMER SESSION.

   c. Business students must successfully complete these three remaining lower-level Core Business Knowledge (CBK) courses at Texas A&M during their first upper-level semester, unless satisfactorily completed prior to upper-level entry:

   d. Students are encouraged to complete the freshman and sophomore sequence of courses as listed under Curriculum in Business. BUAD students may preregister for upper-level business courses in the semester for which they have applied for upper level. However, students who fail to complete upper-level requirements shall not be permitted to remain registered in upper-level business classes.

2. Transfer students: Transfer students admitted to Mays Business School will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1, at which time they may apply for admission to an upper-level major field of study. Transfer students may immediately apply for upper-level when admitted to Mays Business School if, and only if, they meet all upper-level requirements at that time.

3. Change of curriculum students: Texas A&M students who change curriculum into Mays Business School from another college or department at the University will be classified as BUAD (lower-level Business) students until they complete all requirements listed previously in item 1. Change of curriculum students who, when admitted to the business school, qualify to apply for admission to upper level may do so.

4. Preference for available seats in junior- and senior-level business courses will be given to students who have been admitted to a degree granting major in Mays Business School. All ineligible students who pre-register for upper-level business classes are subject to cancellation of their registration in these courses.

Program Requirements

Lower-Level Business Program (BUAD)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ACCT 230</td>
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<td>3</td>
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<tr>
<td>ISTM 210</td>
<td>Fundamentals of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
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</table>

First Year

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
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</tr>
<tr>
<td>American history (p. 25)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
<td></td>
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<tr>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
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</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MATH 142  Business Calculus 3  3
American history (p. 25) 2  3
Language, philosophy and culture (p. 23)  3
Life and physical sciences (p. 22)  3

Semester Credit Hours  15

Second Year

Fall
ACCT 229  Introductory Accounting  3
ECON 203  Principles of Economics  3
ISTM 210  Fundamentals of Information Systems  3
POLS 206  American National Government 2  3

Communication
Select one of the following:
COMM 203  Public Speaking  3
COMM 205  Communication for Technical Professions  3
COMM 243  Argumentation and Debate  3
ENGL 104  Composition and Rhetoric  3

Semester Credit Hours  15

Spring
ACCT 230  Introductory Accounting  3
MGMT 211  Legal and Social Environment of Business  3
POLS 207  State and Local Government 2  3
Creative arts (p. 24)  3
Life and physical sciences (p. 22)  3

Semester Credit Hours  15

Total Semester Credit Hours  60

1 MATH 141, MATH 148, MATH 152, MATH 166 and MATH 172 will be accepted in lieu of MATH 140.
2 For those students under ROTC contract, see Requirement 7 of the "Requirements for a Baccalaureate Degree" (p. 27).
3 MATH 131, MATH 147, MATH 151 and MATH 171 will be accepted in lieu of MATH 142.

Management Information Systems: Students intending to major in Management Information Systems must add ISTM 250 Business Programming Logic and Design (3 credits) to sophomore year curriculum in Business (lower level). The creative arts elective or a communication elective can be taken during the junior year.

Business Honors: Students admitted to Business Honors must add (1) BUSN 125 Business Learning Community I (3 credits) to the freshman year curriculum and (2) BUSN 225 Business Competency (3 credits) to the sophomore year curriculum in Business (lower level). The creative arts elective and a communication elective can be taken during the junior year.

Finance: Students intending to major in Finance must add FINC 210 to freshman year curriculum in Business (lower-level). The general elective taken in the senior year can be reduced by 1 credit.

Upper-Level Marketing Program

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>FINC 341</td>
<td>Business Finance</td>
</tr>
<tr>
<td></td>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
</tr>
<tr>
<td></td>
<td>MKTG 321</td>
<td>Marketing 1</td>
</tr>
<tr>
<td></td>
<td>MKTG 404</td>
<td>Advanced Excel for Marketing Managers</td>
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<tr>
<td></td>
<td>SCMT 303</td>
<td>Statistical Methods</td>
</tr>
<tr>
<td></td>
<td>General elective 2</td>
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</tbody>
</table>

Semester Credit Hours  15

Spring
MGMT 322  Consumer Behavior  3
MGMT 323  Marketing Research  3
SCMT 364  Operations Management  3
Directed Elective 3  3
International elective 4  3

Semester Credit Hours  15

Fourth Year

Fall
Marketing elective (p. 898) 5  3
Directed elective 3  3
 Directed elective 3  3
General elective 2  3
International elective 4  3

Semester Credit Hours  15

Total Semester Credit Hours  60

1 This course is an approved writing-designated (W) or oral communication (C) business course. See your academic advisor for additional information.
2 Elective courses are open to any course offered for University credit, except ACCT 209, ACCT 210, FINC 409, IBUS 301, ISTM 209, KINE 198, MGMT 209, MGMT 309, MGMT 409, SCMT 309. Additional restrictions may apply: see academic advisor for information. May be taken on a satisfactory/unsatisfactory basis. Twelve hours required. Select from MGMT 325, MGMT 326, MGMT 425, MGMT 426 and MGMT 438.
3 Six hours required. A complete list of approved courses is available in the Undergraduate Advising Office, 238 Wehner Building. The six hours of approved international elective courses simultaneously fulfill the University's International and Cultural Diversity Graduation requirement.
4 Six hours required. Any MKTG course (except required MKTG courses and MKTG 409) and IBUS 401-IBUS 403 (p. 848). A maximum of 6 hours of MKTG 402/IBUS 402, MKTG 403/IBUS 403, MKTG 484, MKTG 485, BUSN 392 may be used.
Advertising Strategy - Certificate

The Department of Marketing offers BBA undergraduate students interested in advertising several opportunities for building skills specific to that career, and for networking with advertising professionals. In addition to taking advertising courses, students can attend professional conferences, participate in local, regional, and national advertising campaign competitions, and tour top advertising agencies.

Of particular interest is the Certificate in Advertising Strategy, which supplements the BBA degree by providing an opportunity to tailor elective course offerings and build specific advertising skills. It also provides recruiters a means for identifying top students interested in advertising. Students who earn the Certificate in Advertising are well-prepared for careers in advertising account services or brand management, or they may choose to specialize in related areas such as media planning, social and digital media, or public relations.

The Certificate in Advertising requires three approved advertising related classes, an internship, and active participation in the Aggie Advertising Club. For more information, contact an academic advisor in marketing.

Students pursuing the certificate must complete all program requirements prior to graduation. A certificate notation will be added to the transcript after graduation.

Program Requirements

Requirements include 12 hours of specific coursework, with a grade of 'B' or better required in each certificate course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>MKTG 299</td>
<td>Marketing Professional Organization Involvement</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>MKTG 298</td>
<td>Marketing Internship Experience</td>
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<tr>
<td>MKTG 484</td>
<td>Marketing Internship</td>
<td></td>
</tr>
<tr>
<td>Select four of the following:</td>
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<td></td>
</tr>
<tr>
<td>MKTG 345</td>
<td>Social Media and Public Relations</td>
<td></td>
</tr>
<tr>
<td>MKTG 347</td>
<td>Advertising and Creative Marketing Communications</td>
<td></td>
</tr>
<tr>
<td>MKTG 442</td>
<td>Innovation and Product Management</td>
<td></td>
</tr>
<tr>
<td>MKTG 445</td>
<td>Account Planning and Research</td>
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<tr>
<td>MKTG 447</td>
<td>Advanced Advertising: Case Competition</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 12

^1 MKTG 299 should be registered for when there is active participation in Aggie Advertising Club. This is required for a minimum of 2 semesters. Therefore, MKTG 299 must be taken a minimum of two times to receive the certificate.

^2 An internship in the advertising industry is required. The internship must be for a minimum of 300 hours over 15 weeks or fewer. No more than 20% of work can be clerical or unrelated to the development of professional skills in marketing. The internship must offer meaningful, professional-level learning in areas of sales, advertising, retailing, sports marketing, event planning, or communication. The student must comply with all company regulations, health and safety conditions, and legal requirements.

Analytics and Consulting - Certificate

The Certificate in Analytics and Consulting is open to all BBA undergraduate students. The certificate program complements the student’s degree and provides tangible evidence of rigorous academic and experiential preparation for a career in analytics or consulting. Students who earn this certificate can work in marketing analytics or consulting positions for marketing, information systems, or organizational structure.

The curriculum emphasizes marketing analytics and marketing consulting as well as a consulting project in corporate social responsibility. The required internship teaches lessons the classroom cannot.

The certificate requires 12 hours of coursework, an internship, and active participation in the AMA’s student organization at Texas A&M. Through the American Marketing Association (AMA) students refine professional skills including networking, leadership, and career preparation. For more information, contact the marketing academic advisor.

Students pursuing the certificate must complete all program requirements prior to graduation. A certificate notation will be added to the transcript after graduation.

Program Requirements

Requirements include 12 hours of specific coursework, with a grade of "B" or better required in each certificate course, and have a minimum cumulative GPA of 3.0 by graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 299</td>
<td>Marketing Professional Organization Involvement</td>
<td>0</td>
</tr>
<tr>
<td>MKTG 430</td>
<td>Marketing Consulting</td>
<td>3</td>
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<tr>
<td>MKTG 431</td>
<td>Marketing Analytics</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 432</td>
<td>Corporate Social Responsibility</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>MKTG 298</td>
<td>Marketing Internship Experience</td>
<td>2</td>
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<tr>
<td>MKTG 484</td>
<td>Marketing Internship</td>
<td></td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>MKTG 325</td>
<td>Retailing Concepts and Policies</td>
<td>3</td>
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<tr>
<td>MKTG 326</td>
<td>Strategic Retailing</td>
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<tr>
<td>MKTG 335</td>
<td>Professional Selling</td>
<td></td>
</tr>
<tr>
<td>MKTG 345</td>
<td>Social Media and Public Relations</td>
<td></td>
</tr>
<tr>
<td>MKTG 347</td>
<td>Advertising and Creative Marketing Communications</td>
<td></td>
</tr>
<tr>
<td>MKTG 425</td>
<td>Retail Merchandising</td>
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<tr>
<td>MKTG 426</td>
<td>Advanced Retail Case Study</td>
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</table>
Program Requirements

Requirements include 12 hours of specific coursework, with a grade of 'B' or better required in each certificate course, and have a minimum cumulative GPA of 3.0 by graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 298</td>
<td>Marketing Internship Experience ¹</td>
<td>0</td>
</tr>
<tr>
<td>MKTG 299</td>
<td>Marketing Professional Organization Involvement ²</td>
<td>12</td>
</tr>
<tr>
<td>Select four of the following:</td>
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<td></td>
</tr>
<tr>
<td>MKTG 335</td>
<td>Professional Selling</td>
<td></td>
</tr>
<tr>
<td>MKTG 347</td>
<td>Advertising and Creative Marketing Communications</td>
<td></td>
</tr>
<tr>
<td>MKTG 435</td>
<td>Advanced Selling</td>
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</tr>
<tr>
<td>MKTG 436</td>
<td>Sales Leadership (Business to Business Marketing)</td>
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</tr>
<tr>
<td>MKTG 489</td>
<td>Special Topics in...</td>
<td></td>
</tr>
</tbody>
</table>

¹ The internship must be for a minimum of 300 hours over 15 weeks or fewer. No more than 20 percent of work can be clerical or unrelated to the development of professional skills in marketing. The internship must offer meaningful, professional-level learning in areas of sales, advertising, retailing, sports marketing, event planning, or communication. The student must comply with all company regulations, health and safety conditions, and legal requirements.

² MKTG 299 should be registered for when there is active participation in Pi Sigma Epsilon. This is required for a minimum of 2 semesters. MKTG 299 should also be taken in the semester that the student participates in the associated student Texas A&M Collegiate Sales Competition. This competition is required. Therefore, MKTG 299 must be taken a minimum of two times to receive the certificate.

Retail Buying and Management - Certificate

The Center for Retailing Studies (Center), a nationally known and respected center, is part of the Department of Marketing in Mays Business School at Texas A&M University. The Center, a bridge between the academic and business community, serves students, faculty, and partner firms in a variety of ways. Of particular interest to BBA undergraduate students is the Certificate in Retail Buying and Management, which requires four retailing related classes, an internship, and participation in the Student Retailing Association.

Graduates who earn the Certificate in Retail Buying and Management are well equipped for exciting careers in management, merchandising, retail financial planning, and marketing. Most Center partner companies hire students who have earned the certificate into executive development training programs which prepare them for the next level of career advancement.

The certificate is university-recognized, a supplement to a student's degree, and is open to all BBA majors. Through a customized program of retailing, marketing, and related courses, and other educational experiences, students receive focused preparation for a retailing career. Completion of the program provides tangible evidence of commitment and expertise in retailing.

For more information contact Hannah Cole, marketing academic advisor, at hcole@mays.tamu.edu, or the Center for Retailing Studies staff in Suite 201 of the Wehner building.

Students pursuing the certificate must complete all program requirements prior to graduation. A certificate notation will be added to the transcript after graduation.
Program Requirements

Requirements include 12 hours of specific coursework, with a grade of 'B' or better required in each certificate course, and have a minimum cumulative GPA of 3.0 or better by graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MKTG 299</td>
<td>Marketing Professional Organization Involvement</td>
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</tbody>
</table>

Select one of the following:

- MKTG 298 Marketing Internship Experience
- MKTG 484 Marketing Internship

Select four of the following: 12

- MKTG 325 Retailing Concepts and Policies
- MKTG 326 Strategic Retailing
- MKTG 425 Retail Merchandising
- MKTG 426 Advanced Retail Case Study
- MKTG 438 Strategic Digital Marketing

1 MKTG 299 should be registered for when there is active participation in the associated student organization, Student Retailing Association. This is required, for a minimum of 2 semesters.

2 Also, an internship in the retailing industry is required. The internship must be for a minimum of 300 hours over 15 weeks or fewer. No more than 20% of work can be clerical or unrelated to the development of professional skills in marketing. The internship must offer meaningful, professional-level learning in areas of sales, advertising, retailing, sports marketing, event planning, or communication. The student must comply with all company regulations, health and safety conditions, and legal requirements.

University Studies Programs

Mays Business School offers a degree in University Studies with a concentration in business.

A University Studies degree differs from a traditional major in that it consists of a concentration and two minors of 15-18 hours each. The business concentration provides a solid foundation in basic aspects of business including:

- Accounting
- Management Information Systems
- Finance
- Management
- Marketing
- Supply Chain Management

The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

Majors

- Bachelor of Science in University Studies, Business Concentration (p. 283)

University Studies - BS, Business Concentration

The Bachelor of Science in University Studies is offered by Texas A&M University.

Students who earn a Bachelor of Science (BS) in University Studies are able to tailor their undergraduate coursework to align with future personal and career objectives. Specific requirements, course offerings, and restrictions exist for the University Studies-Business degree.

The University Studies-Business curriculum consists of a 24 credit hour business concentration and two minors of 15 to 18 hours each. The degree program offers a number of unique features and benefits:

- Foundational knowledge: The business concentration provides students with a firm grasp of the basic aspects of business including accounting, finance, management, management information systems, marketing and supply chain management.

- Interdisciplinary study: Students pursue two minors that involve coursework in other Texas A&M colleges and departments. Students are encouraged to identify minors that complement the business concentration and reflect their individual interests and strengths.

- Flexibility for the future: Students who earn this degree find they have flexible options after graduation since they are prepared to pursue a wide range of careers and graduate programs.

Careers pursued by University Studies-Business graduates include financial advisor, account manager, marketing coordinator, sales representative, web developer, public relations specialist, consultant, and human resource specialist.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
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<td>FINC 409</td>
<td>Survey of Finance Principles</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 105</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society</td>
<td>3</td>
</tr>
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<td>MGMT 309</td>
<td>Survey of Management</td>
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<tr>
<td>MKTG 409</td>
<td>Principles of Marketing</td>
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<tr>
<td>SCMT 309</td>
<td>Supply Chain Management Principles</td>
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University and College Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition or ENGL 10- Composition and Rhetoric</td>
<td>3</td>
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Select one of the following: 3

- ENGL 203 Writing about Literature
- ENGL 210 Technical and Business Writing
- COMM 203 Public Speaking
- COMM 205 Communication for Technical Professions
- COMM 243 Argumentation and Debate
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<thead>
<tr>
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<tbody>
<tr>
<td>THAR 407</td>
<td>Performing Literature.</td>
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<tr>
<td>Mathematics (p. 22)</td>
<td></td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
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<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td>3</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td></td>
<td>3</td>
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<tr>
<td>American history (p. 25)</td>
<td></td>
<td>6</td>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>Minor choice one ¹</td>
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<td>15-18</td>
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<tr>
<td>Minor choice two ¹</td>
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<td>15-18</td>
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<tr>
<td>Electives ²</td>
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<td><strong>Total Semester Credit Hours</strong></td>
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</table>

¹ The student is encouraged to identify minors that complement the business concentration and reflect the student's individual interests and strengths. The two minors must be completed outside of Mays Business School.

² Enrollment of University Studies majors in courses offered at Mays Business School is limited to the required business concentration courses plus the following courses to be used as electives: ACCT 210, BUSN 302, BUSN 403, FINC 201 and MGMT 212.
COLLEGE OF DENTISTRY

Administrative Officers
Dean - Lawrence E. Wolinsky, Ph.D., D.M.D.
Associate Dean, Academic Affairs - Paul C. Dechow, Ph.D.
Associate Dean, Research and Graduate Studies - Larry L. Bellinger, Ph.D.
Executive Director, Facilities Services and Planning - Dale A. Christensen, M.B.A.
Associate Dean, Student Affairs - Jack L. Long, D.D.S.
Associate Dean, Clinical Affairs - Stephen J. Griffin, D.D.S.
Executive Director, Communications, Institutional Advancement and Alumni Affairs - Susan Mitchell Jackson, M.A.
Associate Dean, Finance and Administration - Juanna S. Moore, C.P.A.
Executive Director, Institutional Research - Eric S. Solomon, D.D.S.

General Statement
The College of Dentistry has been a distinguished resource for dental education in Texas for more than 100 years and is dedicated to combining higher education and research with community service.

Known internationally for producing excellent clinicians, the college opened in 1905. Since then, it has graduated more than 8,000 dentists and dental hygienists. Nearly one-third of all dentists in Texas are College of Dentistry graduates. The college also graduates a large number of dental hygienists with bachelor’s degrees in the state. In addition to a doctor of dental surgery and bachelor’s degree in dental hygiene, postdoctoral certificate and degree programs are offered.

Today, the college works toward innovative treatments, leading-edge technology and better ways to deliver care. It not only ensures that Texas has qualified generations of dentists, dental hygienists and scientists, but also provides care for patients who have no other access to oral health care.

Location
The College of Dentistry is located in Dallas, Texas, adjacent to the rapidly expanding Baylor University Medical Center. The Dallas-Fort Worth metroplex is an area noted for the vigor, optimism and friendliness of its population. The ever-changing skyline reflects the continuing growth of the area.

Opportunities for educational, cultural and religious enrichment are numerous. Within a 100-mile radius of Dallas are more than 40 colleges and universities. Dallas has professional theater, opera, symphony and dance companies. Among the many museums and galleries in the area, the Dallas Museum of Art has received international acclaim for both its design and its exhibits.

For sports enthusiasts, Dallas has professional and college football, basketball, baseball, hockey and soccer teams. The metroplex annually hosts competitions in golf, tennis, bowling, soccer and running that attract many of the world’s best athletes. Numerous lakes and parks provide recreational opportunities for boating, fishing, swimming, jogging, biking and horseback riding.

Dallas is served by a variety of transportation modes, including several interstate highways, the Amtrak rail system and the Dallas Area Rapid Transit system. The Dallas/Fort Worth International Airport, with many major and feeder airline connections, is one of the busiest air terminals in the nation. Airline connections also can be made at nearby Love Field, which is a 20-minute car ride from the college.

The College of Dentistry is centrally located in the city of Dallas, about one mile east of the downtown business district. This is an area where restored historic homes and varied types of new construction create diverse neighborhoods. The Texas State Fairgrounds and the downtown arts district, with its world-class performance halls and art museum, help make this part of Dallas an exciting place to live and work. Living accommodations are located as close as one block from the campus.

Office of Recruitment and Admissions
College of Dentistry
3302 Gaston Ave.
Dallas, TX 75246
(214) 828-8231
https://dentistry.tamhsc.edu/

Majors

Caruth School of Dental Hygiene
- Bachelor of Science in Dental Hygiene (p. 286)

Masters

College of Dentistry
- Master of Science in Oral Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/dentistry/interdepartmental/oral-biology-ms)

Doctoral

College of Dentistry
- Doctor of Philosophy in Oral Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/dentistry/interdepartmental/oral-biology-phd)

Professional

College of Dentistry
- Doctor of Dental Surgery in Dentistry (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/dentistry/interdepartmental/dds)

Caruth School of Dental Hygiene

The Caruth School of Dental Hygiene is an integral part of the College of Dentistry. The dental hygiene school was equipped in 1954 through a generous gift from the Caruth Foundation of Dallas and W.W. Caruth, Jr., in honor of W.W. Caruth, Sr., a pioneer Texas philanthropist.

The first dental hygiene students were accepted in fall 1955. At that time, there was no requirement for previous college experience. In 1964, the Caruth School of Dental Hygiene established prerequisite courses prior to professional study. During the same year, the Bachelor of Science degree was offered in addition to the traditional certificate program. All
graduates since 1973 have received the degree of Bachelor of Science in Dental Hygiene. In 1997, the Master of Science degree was added.

Purpose
The purpose of the Caruth School of Dental Hygiene is to educate preventive oral health professionals, eligible for licensure as dental hygienists, who are capable of providing educational, clinical and therapeutic services that support total health through the promotion of optimal oral health.

Opportunities
The services of a dental hygienist are offered in private dental practices and clinics, public health agencies, school systems, hospitals, nursing homes and corporate health facilities. Dental hygienists also teach in dental and dental hygiene programs and participate in health research. The baccalaureate degree offered through the Caruth School of Dental Hygiene by the College of Dentistry satisfies the educational requirement for eligibility for state licensure. Graduates are provided with diverse experiences to prepare for a variety of employment settings and to pursue graduate education. A Master of Science in Education for Healthcare Professionals with a focus in dental hygiene is also offered.

Faculty
Brown, Maureen D, Adjunct Assistant Professor
Dental Hygiene
BS, Baylor College of Dentistry, 2003

Campbell, Patricia A, Professor
Dental Hygiene
MS, Old Dominion University, 1989

Cotter, Jane C, Assistant Professor
Dental Hygiene
MS, Caruth School of Dental Hygiene, 2009

Fox, Eric, Clinical Assistant Professor
Dental Hygiene
MS, Texas A&M University Baylor College of Dentistry, 2005

Garcia, Alejandra, Clinical Assistant Professor
Dental Hygiene
BS, Baylor College of Dentistry, 1997

Kabani, Faizan A, Associate Professor
Dental Hygiene
BS, Texas Woman’s University, 2016

Kading, Cherri L, Clinical Assistant Professor
Dental Hygiene
MS, University of North Carolina at Chapel Hill, 2009

Mallonee, Lisa F, Professor
Dental Hygiene
MPH, University of North Carolina at Chapel Hill, 2000
BS, University of North Carolina at Chapel Hill, 1990

McCann, Ann L, Professor
Dental Hygiene
PHD, University of Nebraska, 2007

Muzzin, Kathleen B, Clinical Professor
Dental Hygiene
MS, University of Missouri - Kansas City, 1985

Reed, Kayla M, Adjunct Assistant Professor
Dental Hygiene
BS, Midwestern State University, 2011

Vu, Mary T, Clinical Assistant Professor
Dental Hygiene
MS, Texas A&M University Baylor College of Dentistry, 2013

Wyatt, Leigh A, Clinical Associate Professor
Dental Hygiene
MS, Texas A&M University Baylor College of Dentistry, 2014

Majors
- Bachelor of Science in Dental Hygiene (p. 286)

Dental Hygiene - BS

Length: 2 years
General Admissions Requirements: 60 semester hours college coursework including core courses for BS degree
Application Deadline: January 5 of the year of anticipated entrance into the program.
Start Term: Fall
Specialization, Program of Study: Dental Hygiene
Degree: BS

Program Requirements
Coursework totaling 60 semester credit hours, including core courses for BS degree.

Third Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>DDHS 3110</td>
<td>Introduction To Dentistry</td>
<td>1</td>
</tr>
<tr>
<td>DDHS 3120</td>
<td>Dental Anatomy</td>
<td>2</td>
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<tr>
<td>DDHS 3160</td>
<td>Preclinical Dental Hygiene</td>
<td>6</td>
</tr>
<tr>
<td>DDHS 3220</td>
<td>Oral Radiology</td>
<td>5</td>
</tr>
<tr>
<td>DDHS 3250</td>
<td>Biomedical Sciences I</td>
<td>5</td>
</tr>
<tr>
<td>DDHS 3425</td>
<td>Health Promotion and Disease Prevention</td>
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Semester Credit Hours 16.5

Spring

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<thead>
<tr>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>DDHS 3020</td>
<td>Theory of Dental Hygiene Practice I</td>
<td>2</td>
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<tr>
<td>DDHS 3220</td>
<td>Oral Radiology</td>
<td>2</td>
</tr>
<tr>
<td>DDHS 3340</td>
<td>Biomedical Sciences II</td>
<td>4</td>
</tr>
<tr>
<td>DDHS 3310</td>
<td>Health Education and Behavioral Science</td>
<td>1</td>
</tr>
<tr>
<td>DDHS 3410</td>
<td>Introduction to Pathology</td>
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</tr>
<tr>
<td>DDHS 3325</td>
<td>Microbiology</td>
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<tr>
<td>DDHS 3530</td>
<td>Applied Dental Materials</td>
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<tr>
<td>DDHS 3830</td>
<td>Clinical Dental Hygiene I</td>
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</table>

Semester Credit Hours 18.5

Summer

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>DDHS 4110</td>
<td>Medical Emergencies</td>
<td>1</td>
</tr>
<tr>
<td>DDHS 4220</td>
<td>Comprehensive Care Seminar ¹</td>
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### Fourth Year

#### Fall

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<th>Course Title</th>
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<tr>
<td>DDHS 4015</td>
<td>Pharmacology</td>
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<tr>
<td>DDHS 4025</td>
<td>Oral Pathology</td>
<td>2.5</td>
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<tr>
<td>DDHS 4110</td>
<td>Medical Emergencies 1</td>
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</tr>
<tr>
<td>DDHS 4140</td>
<td>Clinical Dental Hygiene III</td>
<td>4</td>
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<tr>
<td>DDHS 4210</td>
<td>Professional Ethics</td>
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<tr>
<td>DDHS 4220</td>
<td>Comprehensive Care Seminar</td>
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<tr>
<td>DDHS 4310</td>
<td>Oral Radiography (continued) 1</td>
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<tr>
<td>DDHS 4410</td>
<td>Gerontology</td>
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<tr>
<td>DDHS 4530</td>
<td>Public and Community Health</td>
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<tr>
<td>DDHS 4610</td>
<td>Periodontics</td>
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<td>DDHS 4620</td>
<td>Theory of Dental Hygiene Practice II</td>
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<tr>
<td>DDHS 4715</td>
<td>Research Methods</td>
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#### Spring

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>DDHS 4010</td>
<td>National Board Review</td>
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<tr>
<td>DDHS 4220</td>
<td>Comprehensive Care Seminar</td>
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<tr>
<td>DDHS 4240</td>
<td>Clinical Dental Hygiene IV</td>
<td>4</td>
</tr>
<tr>
<td>DDHS 4310</td>
<td>Oral Radiography (continued) 1</td>
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<tr>
<td>DDHS 4320</td>
<td>Perspectives in Dental Hygiene</td>
<td>2</td>
</tr>
<tr>
<td>DDHS 4530</td>
<td>Public and Community Health</td>
<td>3</td>
</tr>
<tr>
<td>DDHS 4710</td>
<td>Applied Research Methods</td>
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<tr>
<td>DDHS 4810</td>
<td>Local Anesthesia and Nitrous Oxide/Oxygen Sedation</td>
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1. Scheduled by course director

Semester Credit Hours: 14.5

<table>
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<tbody>
<tr>
<td>DDHS 4010</td>
<td>National Board Review</td>
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<tr>
<td>DDHS 4220</td>
<td>Comprehensive Care Seminar</td>
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<td>DDHS 4240</td>
<td>Clinical Dental Hygiene IV</td>
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<tr>
<td>DDHS 4310</td>
<td>Oral Radiography (continued) 1</td>
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<tr>
<td>DDHS 4320</td>
<td>Perspectives in Dental Hygiene</td>
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<tr>
<td>DDHS 4530</td>
<td>Public and Community Health</td>
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<tr>
<td>DDHS 4710</td>
<td>Applied Research Methods</td>
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<tr>
<td>DDHS 4810</td>
<td>Local Anesthesia and Nitrous Oxide/Oxygen Sedation</td>
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<tr>
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Total Semester Credit Hours: 68.5
The College of Education and Human Development is responsible for building on new knowledge generated through the College of Education and Human Development. Increasingly, these service efforts and businesses and industries is a strong commitment of the College of Education and Human Development. Students interested in secondary certification must report to an advisor in the Department of Teaching, Learning and Culture’s Office of Undergraduate Advising to access additional information about the multiple routes to secondary certification at the post-baccalaureate level.

Teaching fields, specialization areas and endorsements/delivery systems may be chosen from the following:

- Agricultural Science
- Bilingual (EC-6)
- Chemistry
- Computer Science
- Early Childhood
- English Language Arts and Reading
- English as a Second Language
- Health (EC-12)
- History
- Kinesiology (EC-12)
- Languages other than English (Spanish, French, German, Latin, Chinese)
- Life Science
- Mathematics
- Middle School English/Language Arts and Reading
- Middle School Science/Mathematics
- Middle School Social Studies/English
- Language Arts and Reading
- Physical Science
- Science
- Social Studies
- Special Education
- Speech

The College of Education and Human Development carries out its mission of research, teaching and service through the following departments: Educational Administration and Human Resource Development, Educational Psychology, Health and Kinesiology, and Teaching, Learning and Culture. Other contributing entities include Agricultural Education, the Center for Mathematics, Science and Technology Education, and the Counseling and Assessment Clinic. Detailed descriptions of College of Education and Human Development departments are provided on the following pages. The College of Education and Human Development is required by Federal policy to make available the summary report of students’ scores on the TExES examination. This information is available from the Associate Dean for Academic Affairs in the College of Education and Human Development.
General Requirements for Admission to Professional Programs

The programs of study in the College of Education and Human Development are composed of two phases—the pre-professional phase and the professional phase. The pre-professional phase consists of basic University Core Curriculum requirements and introductory courses to the major field of study. The professional phase consists of advanced work in the major field of study, courses in the professional undergirding disciplines and professional studies courses.

Upon entering the College of Education and Human Development, students are assigned a general College of Education and Human Development major that tracks the pre-professional phase of their chosen program. To advance to the professional phase of the chosen program and to be accepted into the professional major, students must meet the program entry requirements and be accepted by the program faculty. Students are responsible for contacting the departmental advisors to obtain information about specific requirements for their major and program areas.

Requirements for Admission to the Professional Phase of Teacher Education Programs

The State of Texas establishes standards for teacher education programs. All certification programs at Texas A&M are in compliance with these requirements. Students must meet state, University, College of Education and Human Development and department/program requirements for matriculation into a teacher education program. Students are responsible for contacting the departmental advisors to obtain information about specific requirements for their major and program areas.

Teacher Education Retention Policy

A student, after being admitted to teacher education, who fails to continue to meet all requirements, will be dropped from the program and may not continue in or register for any professional teacher education course. Any student removed from or who discontinues student teaching because of unsatisfactory performance will be dropped from the teacher education program. A student dropped from the teacher education program may apply through their respective department for readmission to the teacher education program.

Requirements for Admission to Student Teaching

Students are responsible for contacting the departmental advisors to obtain information about specific requirements for their major and program areas.

NOTE: As several of the College of Education and Human Development’s teacher education programs are undergoing change and are pending approval, the programs offered, admission to professional programs, admission to professional phase of teacher education, retention policy, and requirements for admission to student teaching are subject to change. Students should check with advisors in the appropriate departments to receive the most current policies and procedures.

Requirements for Admission to the Professional Phase of Non-Certification Programs

The following requirements must be met by students seeking admission to the professional phase of non-certification programs.

1. An approved degree plan and application for admission to the professional phase of non-certification programs.
2. Minimum GPR as stated in program requirements available from departmental advisor.
3. Satisfy the English proficiency requirement as stated in program requirements available from departmental advisor.
4. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate STAAR, SAT or ACT scores.
5. Have sophomore or junior classification with a minimum of 15 semester credit hours at Texas A&M, and completion of University Core Curriculum requirements applicable to the respective degree program.
6. Admission to professional phase of some programs may be competitive. See departmental advisor.
7. Students must meet departmental criteria before acceptance into an approved internship. See departmental advisor.

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the Graduation requirements. Meeting this requirement will require the careful selection of courses. The student is directed to the Requirements for a Baccalaureate Degree (p. 27) section of this catalog for detailed information regarding this requirement and also is encouraged to seek the advice of the student’s academic advisor.

Curriculum in Agricultural Science

(Teaching Option)

The Agricultural Science curriculum is designed to offer the student a combination of courses in scientific agriculture and in professional education that will meet requirements for employment and advanced study in different careers in which the emphasis is on formal and informal programs of education. Such careers may include teaching agricultural science in high schools, area career and technology schools and community colleges; working as an agricultural extension agent; working as an agricultural representative for a marketing agency, an agricultural supply company or other industries related to agriculture; and serving as an agricultural development specialist in an international program.

A student majoring in agricultural science will be counseled by an advisor in the Department of Agricultural Leadership, Education, and Communications to ensure that the program developed with the student will satisfy his or her unique interests, needs and professional aspirations. A combination of courses in scientific agriculture, education and general studies provides students with a knowledge of scientific agriculture and the ability to work with and influence people. Flexibility in course selection allows a student to place emphasis on a particular field of agriculture or to prepare broadly in agricultural studies. This
flexibility might prepare a student to teach in a particular school setting, focusing upon a certain curriculum (e.g., horticulture, animal science and agricultural business).

Many aspects of the practice of agriculture are learned through experience. Enrollment in high school agricultural science and participation in FFA and/or 4-H are encouraged and recommended.

A student following this curriculum may be eligible to enter public schools as a teacher of agricultural science under the Texas Education Agency. Off-campus student teaching is required.

For further information, see the section on Agricultural Science under the College of Agriculture and Life Sciences. The Department of Agricultural Leadership, Education, and Communications administers the program in Agricultural Science.

**Majors**

**Department of Educational Administration and Human Resource Development**
- Bachelor of Science in Human Resource Development (p. 293)
- Bachelor of Science in Technology Management (p. 294)

**Department of Educational Psychology**
- Bachelor of Science in Interdisciplinary Studies, Bilingual Education-EC6 (p. 298)
- Bachelor of Science in Interdisciplinary Studies, Special Education-EC12 (p. 299)
- Bachelor of Science in University Studies, Child Professional Services Concentration (p. 300)

**Department of Health and Kinesiology**

**Health**
- Bachelor of Science in Community Health (p. 309)
- Bachelor of Science in Health, Allied Health Track (p. 311)
- Bachelor of Science in Health, School Health Track (p. 312)

**Kinesiology**
- Bachelor of Science in Kinesiology, All-Level Physical Education Teacher Certification Track (p. 313)
- Bachelor of Science in Kinesiology, Dance Science Track (p. 314)
- Bachelor of Science in Kinesiology, Exercise Science Track, Applied Exercise Physiology Concentration (p. 316)
- Bachelor of Science in Kinesiology, Exercise Science Track, Basic Exercise Physiology Concentration (p. 317)
- Bachelor of Science in Kinesiology, Exercise Science Track, Motor Behavior Concentration (p. 318)
- Bachelor of Science in Kinesiology and Master of Science in Athletic Training, 5-Year Degree Program (p. 319)
- Bachelor of Science in University Studies, Sports Conditioning Concentration (p. 324)
- Bachelor of Science in University Studies, Dance Concentration (p. 323)

**Sports Management**
- Bachelor of Science in Sport Management, Internship Track (p. 321)
- Bachelor of Science in Sport Management, Non-Internship Track (p. 322)

**Department of Teaching, Learning and Culture**
- Bachelor of Science in Interdisciplinary Studies, English Language Arts/Social Studies, Middle Grades Certification (p. 330)
- Bachelor of Science in Interdisciplinary Studies, Math/Science, Middle Grades Certification (p. 331)
- Bachelor of Science in Interdisciplinary Studies, Pre-K-6, Generalist Certification (p. 332)

**Certification**
- Secondary Graduate Certification Program (p. 333)

**Minors**

**Department of Educational Administration and Human Resource Development**
- Human Resource Development Minor (p. 295)
- Technology Management Minor (p. 295)

**Department of Educational Psychology**
- Creative Studies Minor (p. 301)

**Department of Health and Kinesiology**
- Coaching Minor (p. 325)
- Dance Minor (p. 326)
- Sport Management Minor (p. 326)

**Department of Teaching, Learning and Culture**
- Applied Learning-Science, Technology, Engineering and Mathematics (STEM) Minor (p. 334)

**Certificates**

**Department of Educational Psychology**
- Creative Studies Certificate (p. 302)

**Masters**

**Department of Educational Administration and Human Resource Development**
- Master of Education in Educational Administration (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-administration-human-resource-development/administration-med)
- Master of Science in Educational Administration (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-administration-human-resource-development/administration-ms)
- Master of Science in Educational Human Resource Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-
Department of Educational Psychology

- Master of Education in Bilingual Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/bilingual-med)
- Master of Education in Educational Psychology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/med)
- Master of Education in Educational Technology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/technology-med)
- Master of Education in Special Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/special-education-med)
- Master of Science in Bilingual Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/bilingual-ms)
- Master of Science in Educational Psychology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/ms)
- Master of Science in Special Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/special-education-ms)

Department of Health and Kinesiology

- Master of Science in Athletic Training (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/health-kinesiology/athletic-training-ms)
- Master of Science in Health Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/health-kinesiology/health-education-ms)
- Master of Science in Kinesiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/health-kinesiology/kinesiology-ms)
- Master of Science in Sport Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/health-kinesiology/sport-management-ms)

Department of Teaching, Learning and Culture

- Master of Education in Curriculum and Instruction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/teaching-learning-culture/curriculum-instruction-edd)
- Master of Science in Curriculum and Instruction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/teaching-learning-culture/curriculum-instruction-med)
- Master of Science in Curriculum and Instruction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/teaching-learning-culture/curriculum-instruction-ms)

Doctoral

Department of Educational Administration and Human Resource Development

- Doctor of Education in Educational Administration (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-administration-human-resource-development/administration-edd)
- Doctor of Philosophy in Educational Administration (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-administration-human-resource-development/administration-phd)

Department of Educational Psychology

- Doctor of Philosophy in Counseling Psychology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/counseling-phd)
- Doctor of Philosophy in Educational Psychology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/phd)
- Doctor of Philosophy in Human Resource Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/educational-psychology/school-psychology-phd)

Department of Health and Kinesiology

- Doctor of Philosophy in Health Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/health-kinesiology/health-education-phd)
- Doctor of Philosophy in Kinesiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/health-kinesiology/kinesiology-phd)

Department of Teaching, Learning and Culture

- Doctor of Education in Curriculum and Instruction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/teaching-learning-culture/curriculum-instruction-edd)
- Doctor of Philosophy in Curriculum and Instruction (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/education-human-development/teaching-learning-culture/curriculum-instruction-phd)

Department of Educational Administration and Human Resource Development

The Department of Educational Administration and Human Resource Development prepares people for many professional careers associated with the broad fields of corporate education. The Bachelor of Science
in Human Resource Development and the Bachelor of Science in Technology Management are designed to encourage students to achieve a bachelor’s degree and to enter the profession in their area of specialty. The programs prepare graduates to assume responsibility for enhancing technology, developing workplace competence and strengthening student achievement in their career paths.

Faculty

Alfred, Mary V, Professor
Educ Admn & Human Resource Dev
PHD, The University of Texas at Austin, 1995

Bailey, Krista J, Clinical Associate Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2011

Baumgartner, Lisa M, Associate Professor
Educ Admn & Human Resource Dev
PHD, The University of Georgia, 2000

Beyerlein, Michael M, Professor
Educ Admn & Human Resource Dev
PHD, Colorado State University, 1986

Blanson, Archie L, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2005

Bowen, Daniel H, Assistant Professor
Educ Admn & Human Resource Dev
PHD, University of Arkansas, 2013

Chandler, Jacob R, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
EDD, Sam Houston State University, 2013
MS, Sam Houston State University, 2004

Cole, Stacy C, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2016

Davison, Chayla H, Assistant Professor
Educ Admn & Human Resource Dev
PHD, University of Denver, 2013

Dirani, Khalil M, Associate Professor
Educ Admn & Human Resource Dev
PHD, University of Illinois at Urbana-Champaign, 2007
MBA, Lebanese American University, 2001

Dooley, Larry M, Associate Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 1989

Fowler, Rhonda M, Clinical Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2013

Hutchins, Nancy S, Instructional Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2014

Irby, Beverly J, Professor
Educ Admn & Human Resource Dev
PHD, The University of Mississippi, 1983

Jones, Robert T, Clinical Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2004

Lechuga, Vicente M, Associate Professor
Educ Admn & Human Resource Dev
PHD, University of Southern California, 2005

Lincoln, Yvonna S, Distinguished Professor
Educ Admn & Human Resource Dev
PHD, Indiana University, 1977

Madsen, Jean A, Professor
Educ Admn & Human Resource Dev
PHD, Teachers College, Columbia, New York City, 1987

Mark, Christine L, Clinical Assistant Professor
Educ Admn & Human Resource Dev
PHD, The University of Southern Mississippi, 2014
MBA, University of Toledo, 1989

McDonald, Brenda K, Assistant Lecturer
Educ Admn & Human Resource Dev
MED, Sam Houston State University, 2008

McDonald, Wendy, Assistant Lecturer
Educ Admn & Human Resource Dev
MSW, The University of Texas at Arlington, 1998

Muller, Robert W, Clinical Associate Professor
Educ Admn & Human Resource Dev
PHD, The University of Texas at Austin, 1989

Musoba, Glenda D, Associate Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2004

Nafukho, Fredrick M, Professor
Educ Admn & Human Resource Dev
PHD, Louisiana State University, 1998

Ponjuan, Luis, Associate Professor
Educ Admn & Human Resource Dev
PHD, University of Michigan, 2005

Roumell, Elizabeth A, Assistant Professor
Educ Admn & Human Resource Dev
PHD, University of Wyoming, 2009

Sandlin, Judy R, Clinical Associate Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 1993

Santos, Rose A, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2013

Schubart, Stephen E, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
JD, University of South Carolina, 2007
MS, University of South Carolina, 2003
Program Requirements

First Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
<td>1</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td>3</td>
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Semester Credit Hours 16

Spring

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<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>4</td>
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<tr>
<td>Social and behavioral science (p. 25)</td>
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Semester Credit Hours 16

Second Year

Fall

<table>
<thead>
<tr>
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<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>EHRD 203</td>
<td>Foundations of Human Resource Development</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society</td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>4</td>
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<tr>
<td>Elective</td>
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Semester Credit Hours 16

Spring

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<th>Course Name</th>
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<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
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<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 210</td>
<td>Legal and Ethical Environment of Human Resource Development</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
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Semester Credit Hours 15

Third Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>COMM 315</td>
<td>Interpersonal Communication</td>
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<td>COMM 320</td>
<td>Organizational Communication</td>
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</tr>
<tr>
<td>COMM 335</td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td>EHRD 371</td>
<td>Applied Learning Principles (^1)</td>
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</tr>
<tr>
<td>EHRD 372</td>
<td>Learning and Development in HRD</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 391</td>
<td>Measurement and Evaluation in Human Resource Development and Technology Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
<td>3</td>
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Semester Credit Hours 15

Spring

<table>
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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>EHRD 315</td>
<td>Applied Human Resource Development in the Workplace</td>
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</table>

Majors

• Bachelor of Science in Human Resource Development (p. 293)
• Bachelor of Science in Technology Management (p. 294)

Minors

• Human Resource Development Minor (p. 295)
• Technology Management Minor (p. 295)

Human Resource Development - BS

The curricula for Human Resource Development provides students with the content and course sequence to enter the workforce in either education, business or industry. The program stresses application in real settings as well as strong foundations in knowledge, and has strong field-based components. The following courses have been combined to give students a well-rounded foundation in the roles and responsibilities in education and business settings.
### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 103/104</td>
<td>Introduction to Rhetoric and Composition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Composition and Rhetoric</td>
</tr>
<tr>
<td></td>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
</tr>
<tr>
<td></td>
<td>MATH 141</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government</td>
</tr>
<tr>
<td></td>
<td>American history elective (p. 25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creative arts elective (p. 24)</td>
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#### Second Year

<table>
<thead>
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<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Fall</td>
<td>EHRD 203</td>
<td>Foundations of Human Resource Development</td>
</tr>
<tr>
<td></td>
<td>MGMT 209</td>
<td>Business, Government and Society</td>
</tr>
<tr>
<td></td>
<td>TCMG 272</td>
<td>Technology and End-User Support</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture elective (p. 23)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences elective (p. 22)</td>
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<td>Semester Credit Hours</td>
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#### Third Year

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Fall</td>
<td>EHRD 371</td>
<td>Applied Learning Principles</td>
</tr>
<tr>
<td></td>
<td>EHRD 391</td>
<td>Measurement and Evaluation in Human Resource Development and Technology Management</td>
</tr>
<tr>
<td></td>
<td>EHRD 477</td>
<td>Project Management in Organizations</td>
</tr>
<tr>
<td></td>
<td>MGMT 309</td>
<td>Survey of Management</td>
</tr>
<tr>
<td></td>
<td>TCMG 303</td>
<td>Unix System Administration Practices</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>EHRD 490</td>
<td>Research in Human Resource Development/Technology Management</td>
</tr>
<tr>
<td></td>
<td>MKTG 409</td>
<td>Principles of Marketing</td>
</tr>
<tr>
<td></td>
<td>TCMG 476</td>
<td>Technical Network Capstone</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>13</td>
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</tbody>
</table>
Human Resource Development - Minor

Human Resource Development (HRD) is the process of improving learning and performance in individual, group and organization contexts through domains of expertise such as lifelong learning, career development, training and development, and organization development. A minor in HRD allows for a wider range of potential employment and accommodation to a diverse education professional experience.

Students must submit an application for admission during the following periods:

- Summer/Fall - January 13 through March 10
- Fall Semester - May 15 through June 10
- Spring Semester - September 1 through October 10

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHRD 203</td>
<td>Foundations of Human Resource Development</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 210</td>
<td>Legal and Ethical Environment of Human Resource Development</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 372</td>
<td>Learning and Development in HRD</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 374</td>
<td>Organizational Development</td>
<td>3</td>
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<tr>
<td>Select 6 credit hours from the following:</td>
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</table>

Human Resource Development - Minor

TCMG 412 Contemporary Issues in Technology Management 3
Elective 2
Semester Credit Hours 16

Spring
TCMG 484 Professional Internship 4
EHRD 405 Principles and Practices of Leadership in Human Resource Development and Technology Management 3
TCMG 402 Instructional Technology and Design 5
Semester Credit Hours 12
Total Semester Credit Hours 120

1 Writing or Communication Intensive course.
2 To be selected from University Core Curriculum.
3 To be chosen in consultation with academic advisor, if necessary.
4 Professional Phase.
5 Online course offered.

Students must have completed 60 hours to register for 300- to 400-level courses.

Six hours of international and cultural diversity are required. Selection must be from courses on the approved list. Selection can be courses that also satisfy the requirement for social and behavioral sciences, creative arts, language, philosophy and culture, or electives.

Foreign Language Requirement - two years same foreign language in high school OR one full year (two semesters) of same foreign language in college.

Technology Management - Minor Overview

The Department of Educational Administration and Human Resource Development offers a Technology Management Minor.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCMG 272</td>
<td>Technology and End-User Support</td>
<td>3</td>
</tr>
<tr>
<td>TCMG 274</td>
<td>Foundations of Networking in Education</td>
<td>3</td>
</tr>
<tr>
<td>Select three from the following:</td>
<td></td>
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</tr>
<tr>
<td>TCMG 303</td>
<td>Unix System Administration Practices</td>
<td>3</td>
</tr>
<tr>
<td>TCMG 308</td>
<td>Cybersecurity and Digital Ethics</td>
<td>3</td>
</tr>
<tr>
<td>TCMG 316</td>
<td>Database Systems Administration and Application</td>
<td>3</td>
</tr>
<tr>
<td>TCMG 412</td>
<td>Contemporary Issues in Technology Management</td>
<td>3</td>
</tr>
<tr>
<td>TCMG 476</td>
<td>Technical Network Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

Minimum required GPA to declare minor is a 2.5.

Obtain a "C" or better in each course taken towards minor

Achieve overall GPA of 2.5 in approved minor coursework. Student must enroll after completing 12 hours at Texas A&M and a maximum of 75 hours total.
Department of Educational Psychology

The Department of Educational Psychology offers one undergraduate non-certification degree program in University Studies with an area of concentration in Child Professional Services along with two undergraduate teacher certification programs in Bilingual Education and Special Education. Also offered are undergraduate courses designed to assist prospective educators in understanding human learning and development and to teach.

At the graduate level, the department offers the Master of Science, Master of Education and Doctor of Philosophy degrees. At the master's level, students may emphasize educational technology; bilingual education; cognition, creativity, intelligence, and development; research, measurement and statistics; school counseling; or special education. Doctoral specializations include counseling psychology; cognition, creativity, intelligence and development; bilingual education; learning and technology; research, measurement, and statistics; school psychology; and special education.

Requirements for Admission to Professional Phase

The undergraduate curricula in the Department of Educational Psychology are composed of two phases: the pre-professional phase and the professional phase. Upon acceptance into the department, all students enter the pre-professional phase and are assigned a lower-division classification (EDIS). The pre-professional phase consists of University Core Curriculum requirements and introductory courses to the major field of study. After successful completion of these requirements, students are eligible to apply for admission into the professional phase. Cohorts in bilingual and special education are limited in number and students are admitted on a competitive basis. The application process is competitive, and meeting the minimum program prerequisites does not guarantee admission to the professional phase. If admitted to the professional phase of the program, students will be assigned an upper-level classification (INST). The professional phase consists of advanced work in the major field of study and professional development courses, with field-based experiences.

Requirements for Admission to the Professional Phase of Teacher Education Programs

The State of Texas establishes standards for teacher education programs. All certification programs at Texas A&M are in compliance with these requirements. Students must meet state, University College of Education and Human Development and department/program requirements for matriculation into a teacher education program. Below are the requirements for the traditional certification program. Students are responsible for contacting a departmental advisor to obtain information about specific requirements for majors and program areas, as some programs have requirements beyond those listed below. University-wide requirements for admission to teacher education include the following:

1. An approved degree plan or certification and teaching field plan(s).
2. Minimum GPR of 2.75 for the special education program and 2.75 for the bilingual education program based on all coursework completed at Texas A&M University. (See departmental advisor for additional grade requirements.)
3. Completion of all required University core courses.
4. A grade of B or higher in all certification courses. (See departmental advisor for additional grade requirements).
5. Satisfaction of English proficiency requirement by:
   a. Earning a grade of B or higher in ENGL 103 or ENGL 104 (or receiving credit by exam for the course); or
   b. Earning a grade of B or higher in ENGL 210, ENGL 235 or ENGL 241; and
   c. Earning no grade below C in any course taken in (a) or (b) above.
6. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate STAAR, SAT or ACT scores.
7. Oral interview required for admission to upper level for Hispanic Bilingual Education.
8. Documentation of foreign language and computer literacy requirements on file in the Texas A&M University Office of Admissions.
9. Transcripts from all institutions of higher education on file in the Texas A&M University Office of Admissions.

Requirements for Admission to Student Teaching

1. Successful admission to Professional Phase of Teacher Education.
2. Complete Application for Clinical Teaching by the given deadlines for each semester.
3. Completion of all courses listed on the degree plan. All coursework must have a grade of C or better. See departmental advisor for additional grade requirements.
4. A minimum GPR of 3.0 in upper-level courses in Special Education. See departmental advisor for additional grade requirements.
5. A minimum GPR of 2.75 on all coursework completed at Texas A&M. See departmental advisor for additional grade requirements.
6. Satisfaction of Spanish proficiency requirements (Hispanic Bilingual Education ONLY).
7. In addition to #6, satisfactory performance on the written and oral Spanish proficiency component of the Hispanic Bilingual Education program admission process.

Faculty

Acosta, Sandra T, Assistant Professor
Educational Psychology
PHD, Texas A&M University, 2010

Alexander, Joyce M, Professor
Educational Psychology
PHD, University of Georgia, 1992

Baek, Eunkyeng, Visiting Assistant Professor
Educational Psychology
PHD, University of South Florida, 2015

Blake, Jamilia J, Associate Professor
Educational Psychology
PHD, University of Georgia, 2007
Brossart, Dan F, Associate Professor
Educational Psychology
PHD, University of Missouri - Columbia, 1996

Burke, Mack D, Associate Professor
Educational Psychology
PHD, University of Oregon, 2001

Burke, Shanna H, Professor
Educational Psychology
PHD, University of Oregon, 1998

Byrns, Glenda E, Clinical Associate Professor
Educational Psychology
PHD, Texas A&M University, 2007

Castillo, Linda G, Associate Professor
Educational Psychology
PHD, University of Utah, 1999

Castro Olivo, Sara M, Associate Professor
Educational Psychology
PHD, University of Oregon, 2007

Elliott, Timothy R, Instructional Assistant Professor
Educational Psychology
PHD, University of Missouri - Columbia, 1987

Fogarty, Melissa S, Clinical Assistant Professor
Educational Psychology
PHD, Texas A&M University, 2012

Fournier, Constance J, Clinical Professor
Educational Psychology
PHD, The University of Texas at Austin, 1987

Ganz, Jennifer, Professor
Educational Psychology
PHD, University of Kansas, 2002

Hall, Robert J, Associate Professor
Educational Psychology
PHD, University of California, Los Angeles, 1979

Juntune, Joyce E, Instructional Professor
Educational Psychology
PHD, Texas A&M University, 1997

Kwok, Oi-Man, Professor
Educational Psychology
PHD, Arizona State University, 2005

Lara-Alecio, Rafael, Regents Professor
Educational Psychology
PHD, University of Utah, 1991

Liew, Jeffrey C, Professor
Educational Psychology
PHD, Arizona State University, 2005

Luo, Wen, Associate Professor
Educational Psychology
PHD, Texas A&M University, 2007

McCord, Carly, Visiting Lecturer
Educational Psychology
PHD, Texas A&M University, 2013

Ompendoguelet, Lizette O, Associate Professor
Educational Psychology
PHD, University of Missouri - Columbia, 2009

Padron, Yolanda, Professor
Educational Psychology
PHD, University of Houston, 1985

Palmer, Douglas J, Professor
Educational Psychology
PHD, University of California, Los Angeles, 1977

Pedersen, Susan J, Associate Professor
Educational Psychology
PHD, The University of Texas at Austin, 2000

Perrott, Lisa J, Associate Professor
Educational Psychology
PHD, University of Virginia, 2001

Rae, William A, Clinical Professor
Educational Psychology
PHD, The University of Texas at Austin, 1975

Riccio, Cynthia A, Professor
Educational Psychology
PHD, University of Georgia, 1993

Ridley, Charles R, Professor
Educational Psychology
PHD, University of Minnesota, Twin Cities, 1978

Rivera, Hector H, Assistant Professor
Educational Psychology
PHD, University of California, Santa Cruz, 2001

Simmons, Krystal T, Clinical Associate Professor
Educational Psychology
PHD, Texas A&M University, 2009

Stough, Laura M, Associate Professor
Educational Psychology
PHD, The University of Texas at Austin, 1993

Sweany, Noelle W, Clinical Associate Professor
Educational Psychology
PHD, The University of Texas at Austin, 1999

Thompson, Julie L, Assistant Professor
Educational Psychology
PHD, University of North Carolina at Charlotte, 2014

Tong, Fuhui, Associate Professor
Educational Psychology
PHD, Texas A&M University, 2006

Vannest, Kimberly J, Professor
Educational Psychology
PHD, Louisiana State University, 2000
Walichowski, Miranda F, Clinical Associate Professor
Educational Psychology
PHD, Texas A&M University, 2009

Woltering, Steven, Assistant Professor
Educational Psychology
PHD, University of Toronto, 2012

Woodward, Robert S, Clinical Associate Professor
Educational Psychology
PHD, Texas A&M University, 2004

Yoon, Myeongsun, Associate Professor
Educational Psychology
PHD, Arizona State University, 2007

Yue, Jessica, Instructional Associate Professor
Educational Psychology
PHD, Virginia Polytechnic Institute and State University, 2011

Zhang, Dan D, Professor
Educational Psychology
PHD, University of New Orleans, 1998

Majors

- Bachelor of Science in Interdisciplinary Studies, Bilingual Education-EC-6 (p. 298)
- Bachelor of Science in Interdisciplinary Studies, Special Education-EC-12 (p. 299)
- Bachelor of Science in University Studies, Child Professional Services Concentration (p. 300)

Minors

- Creative Studies Minor (p. 301)

Certificates

Creative Studies Certificate (p. 302)

Interdisciplinary Studies - BS, Bilingual Education EC-6

The Department of Educational Psychology offers an undergraduate degree program in Interdisciplinary Studies that includes certification in bilingual education and general elementary education, grades EC through 6. This program prepares teachers to instruct students who are served in bilingual classes at the elementary level. Students interested in certification in bilingual education should contact the EPSY undergraduate advisor in Heaton Hall.

Program Requirements

The following curriculum leads to the Bachelor of Science degree in Interdisciplinary Studies with certification in Bilingual Education, EC-6. Students are required to meet with their assigned academic advisor prior to registration each semester.

<table>
<thead>
<tr>
<th>First Year</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
</tr>
<tr>
<td>HIST 105 or HIST 106</td>
<td>History of the United States or History of the United States</td>
</tr>
<tr>
<td>MATH 141 or MATH 166</td>
<td>Finite Mathematics or Topics in Contemporary Mathematics II</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
</tr>
<tr>
<td>Creative arts elective (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 203 or ENGL 210</td>
<td>Writing about Literature or Technical and Business Writing</td>
</tr>
<tr>
<td>HIST 226</td>
<td>History of Texas</td>
</tr>
<tr>
<td>MATH 131 or MATH 142</td>
<td>Mathematical Concepts—Calculus or Business Calculus</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
</tr>
<tr>
<td>Life and physical sciences elective</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>BIOL 101</td>
<td>Botany</td>
</tr>
<tr>
<td>BIOL 107</td>
<td>Zoology</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
</tr>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
</tr>
<tr>
<td><strong>Summer</strong></td>
<td></td>
</tr>
<tr>
<td>MATH 365</td>
<td>Structure of Mathematics I</td>
</tr>
<tr>
<td>SPAN 311 or SPAN 312</td>
<td>Hispanic Culture and Civilization to the 18th Century or Hispanic Culture and Civilization: 18th Century to Present</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>GEOG 202 or GEOG 301</td>
<td>Geography of the Global Village or Geography of the United States</td>
</tr>
<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
</tr>
<tr>
<td>SPAN 302</td>
<td>Advanced Grammar</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>Introduction to Culture, Community, Society and Schools</td>
</tr>
<tr>
<td>Life and physical sciences elective</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td>CHEM 106 &amp; CHEM 116</td>
<td>Molecular Science for Citizens and Molecular Science for Citizens Laboratory</td>
</tr>
<tr>
<td>GEOG 203 &amp; GEOG 213</td>
<td>Planet Earth and Planet Earth Lab</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
</tr>
</tbody>
</table>
GEOL 101 Principles of Geology Semester Credit Hours 16

Spring
EDCI 364 Creativity and the Young Child 3
EDCI 353 Early Childhood through Adolescent Education 3
EPFB 210 Family Involvement and Empowerment 3
EPFB 320 or EPSY 321 Child Development or Adolescent Development 3
KINE 120 The Science of Basic Health and Fitness 1
SPAN 303 Spanish Composition 3

Summer
EPSY 485 Directed Studies 1
MATH 366 Structure of Mathematics II 3

Third Year
Fall
BEFB 472 Bilingual and Dual Language Methodologies 3
BEFB 474 Biliteracy for Bilingual and Dual Language Classrooms 3
RDNG 461 Teaching Reading Through Children’s Literature 3
SPAN 320 Introduction to Hispanic Literature 3
TEFB 371 Dynamics and Management in Multicultural/Inclusionary Learning Environments 3

Spring
BEFB 470 Bilingual Assessment and Monitoring 3
BEFB 476 Content Area Instruction for Bilingual Programs 3
RDNG 351 Reading in the Elementary School 3
RDNG 361 Assessment in Reading Instruction 3
SPAN elective 3

Select one of the following:
SPAN 331 Spanish Literature to 1700
SPAN 332 Spanish Literature from 1700 to 1936
SPAN 341 Spanish-American Literature from 1492 to 1821
SPAN 342 Spanish-American Literature from 1821 to 1935
SPAN 350 Spanish Phonetics and Phonology
SPAN 410 Hispanic Film
SPAN 411 Contemporary Hispanic Society and Culture
SPAN 413 Hispanic Culture through Art
SPAN 421 Spanish Language Poetry
SPAN 445 Cervantes
SPAN 450 Contemporary Spanish and Spanish-American Literature

Semester Credit Hours 15

Summer
EPSY 435 or STAT 303 Educational Statistics or Statistical Methods 3

Fourth Year
Fall
RDNG 467 Reading and the Language Arts 3
TEFB 410 Social Studies and the Humanities in the Elementary School 3
TEFB 412 Mathematics in the Elementary School 3
TEFB 413 Science in the Elementary School 3

Spring
BEFB 425 Student Teaching in Hispanic Bilingual Education 3
BEFB 426 Effective Instruction of Hispanic Students of Diverse Abilities 3

Semester Credit Hours 6

Total Semester Credit Hours 124

Interdisciplinary Studies - BS, Special Education EC-12

The Department of Educational Psychology offers an undergraduate degree program in Interdisciplinary Studies that includes certification in special education, EC through grade 12, within the constraints of Texas Certification and The Elementary and Secondary Education Act mandates. This program prepares teachers to instruct students who are served by special education services. Graduates will be prepared to work with students in a wide range of grade levels and settings, serving students with mild to severe disabilities. Students interested in certification in Special Education should contact the EPSY undergraduate advisor in Heaton Hall.

Program Requirements

The following curriculum leads to a Bachelor of Science degree in Interdisciplinary Studies with certification in Special Education K-12. Students are required to meet with their assigned academic advisor prior to registration each semester.

First Year
Fall
ENGL 103 Introduction to Rhetoric and Composition or ENGL 104 Composition and Rhetoric 3
HIST 105 History of the United States or HIST 106 History of the United States 3
MATH 141 Finite Mathematics or MATH 166 Topics in Contemporary Mathematics II 3
POLS 206 American National Government 3
Life and physical sciences elective 4

Select one of the following:
BIOL 101 Botany
BIOL 107 Zoology
<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>BIOL 111 Introductory Biology I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 113 Essentials in Biology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIST 226 History of Texas</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INST 210 Understanding Special Populations</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 131 Mathematical Concepts—Calculus</td>
<td>3</td>
<td>or MATH 142 Business Calculus</td>
</tr>
<tr>
<td></td>
<td>POLS 207 State and Local Government</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences elective</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 101 Fundamentals of Chemistry I</td>
<td>3</td>
<td>&amp; CHEM 111 Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td></td>
<td>CHEM 106 Molecular Science for Citizens</td>
<td>3</td>
<td>&amp; CHEM 116 Molecular Science for Citizens Laboratory</td>
</tr>
<tr>
<td></td>
<td>GEOL 101 Principles of Geology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 106 Historical Geology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 203 Planet Earth</td>
<td>3</td>
<td>&amp; GEOG 213 Planet Earth Lab</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>ENGL 203 Writing about Literature</td>
<td>3</td>
<td>or ENGL 210 Technical and Business Writing</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Second Year</td>
<td>EPFB 210 Family Involvement and Empowerment</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPSY 320 Child Development</td>
<td>3</td>
<td>or EPSY 321 Adolescent Development</td>
</tr>
<tr>
<td></td>
<td>KINE 120 The Science of Basic Health and Fitness</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 365 Structure of Mathematics I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TEFB 273 Introduction to Culture, Community, Society and Schools</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creative arts elective (p. 24)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>HALTH 214/ KINE 214 Health and Physical Activity for Children</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INST 222 Foundations of Education in a Multicultural Society</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INST 362 English as a Second Language Methods I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 366 Structure of Mathematics II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPED 302 Instructional Design for Students with Disabilities</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>INST 301 Educational Psychology</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Third Year</td>
<td>EPFB 301 Teaching Skills I</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**University Studies - BS, Child Professional Services Concentration**

The Department of Educational Psychology offers an undergraduate non-certification degree program in University Studies with an area of concentration in Child Professional Services. This degree is a flexible 120-hour degree program that enables a student to combine a prescribed concentration, two minors, the core curriculum and electives to create a comprehensive degree that aligns with the student’s individual professional interest. The Child Professional Services non-certification concentration requires students to complete a minor in Human Resource Development or Creative Studies and Sociology. This concentration does not allow students to seek teacher certification; however, it offers study in upper level education courses that provides a strong foundation in child and adolescent development, instructional methods, educational psychology, kinesiology, human resource development, and sociology as a means of preparing graduates for careers in civic, social or religious organizations; hospitals or non-profit organizations; or family and community services. Students interested in University Studies - Child...
Program Requirements

The following curriculum leads to a Bachelor of Science degree in University Studies with an area of concentration in Child Professional Services. Students are required to meet with their assigned academic advisor prior to registration each semester.

### First Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>3</td>
</tr>
<tr>
<td>HIST 105</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141 or MATH 166</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>3</td>
</tr>
<tr>
<td>Life and Physical sciences elective</td>
<td>4</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 16

#### Spring

Select one of the following:

- MATH 131 Mathematical Concepts—Calculus 3
- MATH 142 Business Calculus 3
- PHIL 240 Introduction to Logic 3
- POLS 207 State and Local Government 3

Select one of the following:

- ENGL 203 Writing about Literature 3
- ENGL 210 Technical and Business Writing 3
- COMM 203 Public Speaking 3
- HIST 106 or HIST 226 History of the United States or History of Texas 3

Life and Physical sciences elective (p. 22) 4

Semester Credit Hours: 16

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHRD 203</td>
<td>3</td>
</tr>
<tr>
<td>INST 210</td>
<td>3</td>
</tr>
<tr>
<td>INST 222</td>
<td>3</td>
</tr>
<tr>
<td>KINE 120</td>
<td>1</td>
</tr>
<tr>
<td>Language, philosophy and culture elective</td>
<td>3</td>
</tr>
<tr>
<td>SOCI minor elective ²</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 16

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>EHRD 210</td>
<td>3</td>
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<tr>
<td>EPFB 210</td>
<td>3</td>
</tr>
<tr>
<td>EPSY 435</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>3</td>
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Semester Credit Hours: 16

### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Creative arts elective</td>
<td>3</td>
</tr>
<tr>
<td>SOCI minor elective ²</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
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<tr>
<td>EHRD 371</td>
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Semester Credit Hours: 15

#### Spring

<table>
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<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>KINE 214/ HLTH 214</td>
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</tr>
<tr>
<td>SOCI minor elective ²</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 372</td>
<td>3</td>
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Semester Credit Hours: 15

### Fourth Year

#### Fall

<table>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td>EPSY 320</td>
<td>3</td>
</tr>
<tr>
<td>SOCI minor elective ²</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 374</td>
<td>3</td>
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</table>

Semester Credit Hours: 15

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>EPSY 321</td>
<td>3</td>
</tr>
<tr>
<td>INST 301</td>
<td>3</td>
</tr>
<tr>
<td>Elective ¹</td>
<td>3</td>
</tr>
<tr>
<td>EHRD 315 or EHRD 405 or EHRD 408 or</td>
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</tr>
<tr>
<td>EHRD 413</td>
<td>3</td>
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</table>

Semester Credit Hours: 15

Total Semester Credit Hours: 120

1  Free elective can be chosen from any 300-400 level course of student’s choice.
2  Sociology minor elective to be selected from approved list of courses in the Department of Sociology (p. 553).

### Creative Studies - Minor

The Creative Studies minor is provides knowledge and strategies to help you think more creatively within the area of your future profession. Everyone has the ability to think more creatively. Our job is to help you develop and grow your creative ability. Creativity changes the way you think about personal and professional situations.
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPSY 430</td>
<td>Creativity Theories and Research</td>
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</tr>
<tr>
<td>EPSY 433</td>
<td>Lateral Thinking</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
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</table>

Option 1

Select three of the following:

<table>
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<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENDS 101</td>
<td>Design Process</td>
<td></td>
</tr>
<tr>
<td>EPSY 431</td>
<td>Personal Creativity and Giftedness</td>
<td></td>
</tr>
<tr>
<td>EPSY 432</td>
<td>Creativity and Creative Problem Solving</td>
<td></td>
</tr>
<tr>
<td>EPSY 485</td>
<td>Directed Studies</td>
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</tbody>
</table>

Option 2

Select two of the following:

<table>
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</thead>
<tbody>
<tr>
<td>ENDS 101</td>
<td>Design Process</td>
<td></td>
</tr>
<tr>
<td>EPSY 431</td>
<td>Personal Creativity and Giftedness</td>
<td></td>
</tr>
<tr>
<td>EPSY 432</td>
<td>Creativity and Creative Problem Solving</td>
<td></td>
</tr>
<tr>
<td>EPSY 485</td>
<td>Directed Studies</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTS 111</td>
<td>Drawing I</td>
<td></td>
</tr>
<tr>
<td>ARTS 115</td>
<td>Drawing for Visualization</td>
<td></td>
</tr>
<tr>
<td>ENDS 115</td>
<td>Design Communication Foundations</td>
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</tr>
<tr>
<td>ENGL 347</td>
<td>Writers’ Workshop: Prose</td>
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<tr>
<td>ENGL 348</td>
<td>Writers’ Workshop: Poetry</td>
<td></td>
</tr>
<tr>
<td>EPSY 459</td>
<td>Practicum in Educating the Gifted and Talented</td>
<td></td>
</tr>
<tr>
<td>HORT 203</td>
<td>Floral Design</td>
<td></td>
</tr>
<tr>
<td>MKTG 345</td>
<td>Social Media and Public Relations</td>
<td></td>
</tr>
<tr>
<td>MKTG 442</td>
<td>Innovation and Product Management</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 12

Creative Studies - Certificate

The Department of Educational Psychology offers a certificate in Creative Studies. This 12-credit fully online certificate is targeted to mid-career professionals desiring to improve their understanding and application of creative thinking to their personal and professional lives. The course of study will be developed in collaboration with the certificate advisor. Examples of course offerings are listed under the Creative Studies Minor. Courses cover theories of creativity, personal creativity and creative strategies such as Creative Problem Solving and Lateral Thinking.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory of Creativity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
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<td>3</td>
</tr>
<tr>
<td>ENDS 101</td>
<td>Design Process</td>
<td></td>
</tr>
</tbody>
</table>

Department of Health and Kinesiology

The Department of Health and Kinesiology offers degrees in Health, Kinesiology, Sport Management and University Studies. Several tracks are offered for students who are interested in a career in these fields. All students majoring in the Department of Health and Kinesiology are assigned an advisor in accordance with their career choice.

The curricula in Health, Kinesiology, Sport Management and University Studies offer opportunities to obtain professional preparation for careers such as health and physical education teachers in public and private schools, coaches, sport administrators, community health educators, clinical and applied exercise physiologists, exercise scientists, recreational leaders (in non-school agencies), dance scientists, sports marketing professionals and athletic administrators. The department also provides academic preparation for students interested in allied health and medical related professional schools, e.g., physical therapy, occupational therapy, physicians’ assistant or medicine.

The Department of Health and Kinesiology offers minors in coaching, dance and sport management. The coaching and dance minors consist of 18 credit hours. The sport management minor is 15 credit hours. A list of courses and enrollment information regarding the minor may be obtained from the Advising Office in the Department of Health and Kinesiology.

In addition to undergraduate degrees, the department offers the Master of Education, Master of Science, Doctor of Education and Doctor of Philosophy degrees.

Teacher Certification

Students majoring in either Health or Kinesiology may qualify for a Provisional Teaching Certificate after being admitted to teacher education, completing the prescribed requirements, and being recommended by the department to the Texas Education Agency through the University’s Council for Teacher Education. Completion of this degree and other academic requirements does not automatically assure that the student will be recommended for a teaching certificate. Students interested in Texas certification for a teaching career must apply for, and be admitted to, the professional phase of teacher education. See the section entitled “Requirements for Admission to the Professional Phase of Teacher Education” for additional information. Students should see an
Non-Teacher Certification Tracks

Students may seek a career other than public school teaching. The department offers opportunities in allied health, community health, dance science, exercise science, motor behavior and sport management. Students are encouraged to declare career intentions early so that appropriate coursework and field experiences may be planned. Students pursuing careers other than teaching are not eligible for teacher certification. These opportunities are briefly summarized in the descriptions of each track.

Students interested in obtaining a degree must apply for, and be admitted to, the professional phase of a specific track (i.e., exercise science, sport management, community health, allied health or dance science). See the section entitled “Requirements for Admission to the Professional Phase of Non-Certification Tracks (p. 288)” for additional information.

Departmental Advising

Because of the wide variety of careers in Health, Kinesiology and Sport Management and the difference in course requirements for each, it is essential for students to take advantage of the advising opportunities offered by the department. Students are assigned to an academic advisor in accordance with their degree choice. Students are encouraged to declare career intentions early so appropriate coursework may be planned. All undergraduate advising matters are handled by the advisors in the department’s Advising Office. Information concerning entrance to professional schools in health-related fields is available from the Office of Professional School Advising.

Students are encouraged to become involved in professional organizations and extracurricular activities that afford opportunities for becoming involved in their respective professions.

General Requirements for Admission to Professional Phase

The curricula in the Department of Health and Kinesiology are composed of two phases: the pre-professional phase and the professional phase. Upon acceptance into the department, all students enter the pre-professional phase and are assigned a lower-division classification in Community Health (CHLL), Health (EDHL), Kinesiology (EDKI) or Sport Management (EDSM). The pre-professional phase consists of University Core Curriculum requirements and introductory courses to the major field of study. After successful completion of these requirements, students may be accepted into the professional phase and assigned an upper-level classification in Community Health, (CHLT), Health (EDHL), Kinesiology (KINE) or Sport Management (SPMT). The professional phase consists of advanced work in the major field of study and professional development courses. Students are not guaranteed automatic admission to the professional phase.

Requirements for Admission to the Professional Phase of Teacher Education

The State of Texas establishes standards for teacher education. All certification programs at Texas A&M University are in compliance with these requirements. Students must meet State, University, College of Education and Human Development and department/program requirements for matriculation into teacher education. Students are responsible for contacting the Advising Office in the Department of Health and Kinesiology to obtain information about specific requirements, which include the following.

1. Complete the following communication requirement:
   a. Physical Education: Complete both Communications electives on degree plan with a grade combination of B/C or higher.
   b. School Health: Complete ENGL 103 or ENGL 104 with at least a grade of C or higher. (If completed with the C, the COMM 203 course must be completed with at least a B, but is not required for professional phase.)

2. Complete the following courses with a grade of C or better:
   a. | Code | Title | Semester Credit Hours |
      |------|------|-----------------------|
      | BIOL 107 | Zoology | 4 |
      | KINE 121 | Physical and Motor Fitness Assessment | 2 |
      | KINE 213 | Foundations of Kinesiology | 3 |
      | KINE 199 | Required Physical Activity (Majors) | 2 |
      | KNFB 222/ | Teaching and Schooling in | 3 |
      | HEFB 222 | Modern Society | 3 |
      | PHYS 201 | College Physics | 4 |
      | MATH (p. 22) | | 3 |

   b. | Code | Title | Semester Credit Hours |
      |------|------|-----------------------|
      | BIOL 107 | Zoology | 4 |
      | CHEM 101 | Fundamentals of Chemistry I | 4 |
      | & CHEM 111 | and Fundamentals of Chemistry Laboratory I | |
      | HYFB 222/ | Teaching and Schooling in | 3 |
      | KNFB 222 | Modern Society | 3 |
      | HLTH 210 | Introduction to the Discipline | 3 |
      | HLTH 231 | Healthy Lifestyles | 3 |
      | MATH (p. 22) | | 3 |

1. One of the two required MATH classes on degree plan.

3. GPR requirements:
   a. Overall 2.75 on all coursework taken at any institution of higher education.
   b. Once admitted into professional phase, students must maintain a minimum GPR of 2.5 or higher in the following areas: overall at Texas A&M University, on all degree plan coursework, on all professional development coursework and on major coursework

4. A grade of C or better must be made in each of the following: science, professional development and major (HLTH and KINE) courses (those courses taken at Texas A&M and those taken elsewhere and transferred to Texas A&M).
5. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate STAAR, SAT or ACT scores.
6. Complete application for the professional phase of teacher education before the deadline during the semester all above criteria are met (see academic advisor for date). Application for professional phase includes documentation of professional organizations and certificates, Code of Ethics, FERPA acknowledgement and Expectation for Professional Behavior form signed by student and program coordinator.
7. Demonstrate swimming proficiency (for KINE majors).

NOTE: Undergraduate students enrolled in professional phase of teacher preparation programs incur a differential tuition charge of $300 in each of the remaining semesters.

Requirements for Admission to Student Teaching

1. Successful admission to Professional Phase of Teacher Education.
2. Complete Intent to Student Teach form at the time of application for professional phase.
3. Complete all degree plan coursework except KNFB 450/HEFB 450/HEFB 450/KNFB 450.
4. GPR requirements:
   a. minimum of 2.5 on all coursework completed at Texas A&M.
   b. minimum of 2.5 on all coursework that applies to the degree plan.
   c. minimum of 2.5 computed for each: professional development and major courses.
5. A grade of C or better must be made in each of the following: science, professional development, major and support field courses (those courses taken at Texas A&M and those taken elsewhere and transferred to Texas A&M).
7. Successful completion of the English Language Learner and Ethics Training Module.

Requirements for Admission to the Professional Phase of Non-Certification Tracks

The following requirements must be met by students seeking admission to the professional phase of non-certification tracks in Health and Kinesiology. Students are responsible for contacting the Advising Office in the Department of Health and Kinesiology to obtain information about specific requirements.

1. Complete the following courses with a grade combination of B/C or higher:

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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 107</td>
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<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
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<tr>
<td>BIOL 320</td>
<td>Integrated Human Anatomy and Physiology II</td>
<td>4</td>
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<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>HLTH 210</td>
<td>Introduction to the Discipline</td>
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<tr>
<td>HLTH 231</td>
<td>Healthy Lifestyles</td>
<td>3</td>
</tr>
<tr>
<td>HLTH 240/KINE 240</td>
<td>Computer Technology in Health and Kinesiology</td>
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<td>MATH 1</td>
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<td>or Introductory Biology I</td>
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<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
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<tr>
<td>BIOL 320</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>HLTH 210</td>
<td>Introduction to the Discipline</td>
<td>3</td>
</tr>
<tr>
<td>HLTH 231</td>
<td>Healthy Lifestyles</td>
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<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition or ENGL 105 or Composition and Rhetoric</td>
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</tr>
<tr>
<td>or ENGL 105</td>
<td>or Composition and Rhetoric</td>
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<tr>
<td>KNFB 450/HEFB 450/KNFB 450</td>
<td>Second Communications/English course</td>
<td>3</td>
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</table>
 Requirements for Admission to Internship

1. Successful admission to Professional Phase of Non-Certification Track.
2. Submit the Application for Internship form prior to the deadline (check with your advisor for deadlines) the semester before enrolling in pre-intern courses.
3. Minimum 2.5 on all coursework completed at Texas A&M except Sport Management which requires a 2.00.
4. Health and Kinesiology requires a grade of C or better must be made in each of the following: science, professional development and major courses (those courses taken at Texas A&M and those taken elsewhere and transferred to Texas A&M).
5. Complete all degree plan courses prior to internship experience.
6. Approval of Application for Internship by program coordinator.

Faculty

Agnor, Dottiedee, Instructional Associate Professor
Health & Kinesiology
MS, Texas A&M University, 1992

Alvarez, Andrea, Instructional Assistant Professor
Health & Kinesiology
MFA, Case Western Reserve University, 2016

Apostolopoulos, Yiorgos, Associate Professor
Health & Kinesiology
PHD, University of Connecticut, 1994

Armstrong, Carisa L, Clinical Associate Professor
Health & Kinesiology
MFA, Case Western Reserve University, 2002

Baldwin, Janetta, Instructional Professor
Health & Kinesiology
MS, Texas A&M University, 1980

Baletka, Dawn M, Instructional Assistant Professor
Health & Kinesiology
PHD, Sam Houston State University, 2006

Ballard, Danny J, Adjunct Professor
Health & Kinesiology
MS, Texas A&M University, 1980

Baletka, Dawn M, Instructional Assistant Professor
Health & Kinesiology
PHD, Sam Houston State University, 2006

Ballard, Danny J, Adjunct Professor
Health & Kinesiology
PHD, Texas A&M University, 2011

Barry, Adam, Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 2007
Batista, Paul J, Associate Professor  
Health & Kinesiology  
JD, Baylor University, 1976

Bedford, Diane C, Clinical Assistant Professor  
Health & Kinesiology  
MFA, Florida State University, 2010

Bennett, Gregg R, Professor  
Health & Kinesiology  
PHD, Auburn University, 1997

Bergeron, Christine S, Clinical Professor  
Health & Kinesiology  
MFA, Florida State University, 1998

Berthot, Patricia A, Instructional Associate Professor  
Health & Kinesiology  
MED, Stephen F. Austin State University, 1990

Bloomfield, Susan A, Professor  
Health & Kinesiology  
PHD, The Ohio State University, 1992

Bosquez, Janet M, Instructional Assistant Professor  
Health & Kinesiology  
MS, Texas A&M University, 1986

Boucher, Anthony M, Clinical Associate Professor  
Health & Kinesiology  
PHD, Texas Woman's University, 2008

Breaux, Wade J, Instructional Assistant Professor  
Health & Kinesiology  
MS, Texas A&M University, 2002

Brekken, Kirstin L, Instructional Professor  
Health & Kinesiology  
MS, Texas A&M University, 1982

Brison, Natasha T, Assistant Professor  
Health & Kinesiology  
PHD, University of Georgia, 2015  
JD, University of Georgia School of Law, 1998

Buchanan, John J, Professor  
Health & Kinesiology  
PHD, Florida Atlantic University, 1996

Campbell, August J, Instructional Assistant Professor  
Health & Kinesiology  
PHD, Texas State University, 2005

Campbell, Kelli R, Instructional Assistant Professor  
Health & Kinesiology  
MS, Texas A&M University, 2000

Chapman, Denise D, Instructional Assistant Professor  
Health & Kinesiology  
MS, University of Central Missouri, 2000

Chen, Lei-Shih, Associate Professor  
Health & Kinesiology  
PHD, Texas A&M University, 2007

Clark, Heather R, Clinical Assistant Professor  
Health & Kinesiology  
PHD, Texas A&M University, 2014

Coady, William J, Instructional Associate Professor  
Health & Kinesiology  
MS, Texas A&M University, 1992

Crouse, Stephen F, Professor  
Health & Kinesiology  
PHD, The University of New Mexico, 1984

Cunningham, George B, Professor  
Health & Kinesiology  
PHD, The Ohio State University, 2002

Dannenbaum, Joseph H, Instructional Associate Professor  
Health & Kinesiology  
MA, Oklahoma State University, 2005

Darnell, Gayden S, Instructional Associate Professor  
Health & Kinesiology  
MS, Texas A&M University, 1997

Deutz, Nicolaas, Professor  
Health & Kinesiology  
MD, University of Amsterdam, 1988

Dixon, Marlene A, Professor  
Health & Kinesiology  
PHD, The Ohio State University, 2002

Dixon, Mary O, Clinical Assistant Professor  
Health & Kinesiology  
PHD, Texas A&M University, 2011

Dixon, Stuart M, Instructional Associate Professor  
Health & Kinesiology  
MED, Concordia University Texas, 2009

Eliot, John F, Clinical Associate Professor  
Health & Kinesiology  
PHD, University of Virginia, 1998

Ellis, Robert B, Instructional Assistant Professor  
Health & Kinesiology  
BA, Oklahoma State University, 1964

Engelen, Marielle P, Associate Professor  
Health & Kinesiology  
PHD, Maastricht University, Netherlands, 2000

Fehr, Sara K, Clinical Assistant Professor  
Health & Kinesiology  
PHD, University of Cincinnati, 2015

Fluckey, James D, Professor  
Health & Kinesiology  
PHD, The Pennsylvania State University, 1995

Gabbard, Carl P, Senior Professor  
Health & Kinesiology  
PHD, North Texas State University, 1977
Garney, Whitney R, Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2015

Gegg, Laura G, Instructional Associate Professor
Health & Kinesiology
MED, Texas A&M University, 2009

Gilreath, Tamika D, Associate Professor
Health & Kinesiology
PHD, The Pennsylvania State University, 2007

Gomez, Daniel, Instructional Associate Professor
Health & Kinesiology
MED, Texas A&M University, 2010

Gomez, Lorinda B, Instructional Associate Professor
Health & Kinesiology
MS, Texas A&M University, 2006

Goodson, Patricia, Professor
Health & Kinesiology
PHD, The University of Texas at Austin, 1996

Grant, Melinda L, Instructional Professor
Health & Kinesiology
MS, West Virginia University, 1976

Green, John S, Clinical Professor
Health & Kinesiology
PHD, Texas A&M University, 1996

Green, Lisa L, Adjunct Assistant Professor
Health & Kinesiology
PHD, Texas Woman's University, 2001

Greenwood, C Michael, Clinical Professor
Health & Kinesiology
PHD, Texas Woman's University, 1990

Greenwood, Lori, Clinical Professor
Health & Kinesiology
PHD, Oregon State University, 1995

Guidry, Jeffrey J, Associate Professor
Health & Kinesiology
PHD, The University of Texas Health Science Center at Houston, 1994

Guinn, James R, Instructional Assistant Professor
Health & Kinesiology
MA, Abilene Christian University, 2012

Gunnels, Emily E, Lecturer
Health & Kinesiology
MS, Texas A&M University, 2005

Hanik, Michael G, Instructional Assistant Professor
Health & Kinesiology
MS, Northwestern State University of Louisiana, 1996

Harvey, Idethia S, Associate Professor
Health & Kinesiology
PHD, University of Pittsburgh, 2014

Henthorne, Mary B, Instructional Assistant Professor
Health & Kinesiology
MS, Texas A&M University, 2008

Hourahan, Johanna E, Instructional Associate Professor
Health & Kinesiology
MED, Texas A&M University, 2008

Hudson, Shane L, Clinical Professor
Health & Kinesiology
PHD, Texas A&M University, 2007

Kalbasi, Shaida, Instructional Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2015

Keiper, Paul, Clinical Associate Professor
Health & Kinesiology
EDD, Texas A&M University, 2002

Kennedy, Deanna M, Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2015

Kirkham, Ernest P, Instructional Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 1981

Kniffin, Daniel A, Instructional Professor
Health & Kinesiology
MED, The University of Texas at Austin, 1987

Kreider, Richard, Professor
Health & Kinesiology
PHD, University of Southern Mississippi, 1987

Lawler, John, Professor
Health & Kinesiology
PHD, University of Florida, 1991

Lemke, Michael K, Clinical Assistant Professor
Health & Kinesiology
PHD, Wichita State University, 2013

Lieben, Cindy, Research Assistant Professor
Health & Kinesiology
PHD, Maastricht University, Netherlands, 2004

Lightfoot, John, Professor
Health & Kinesiology
PHD, University of Tennessee, 1986

Lintz, Leah E, Instructional Assistant Professor
Health & Kinesiology
MS, Texas A&M University, 2003

Liu, Jiling, Instructional Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2016

Lockard, Britannie L, Adjunct Assistant Professor
Health & Kinesiology
PHD, East Carolina University, 2004
Locklear, Alyssa D, Instructional Associate Professor
Health & Kinesiology
MA, Texas A&M University, 2003

Markowsky, Vicki J, Instructional Professor
Health & Kinesiology
MS, Texas A&M University, 1981

Martin, Steven E, Clinical Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 2008

Massett, Michael P, Associate Professor
Health & Kinesiology
PHD, University of Illinois at Urbana-Champaign, 1997

McNeill, Elisa H, Clinical Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 2010

Melton, Elizabeth N, Instructional Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2012

Miller, Paula J, Clinical Professor
Health & Kinesiology
PHD, Texas A&M University, 1993

Milstein, Sloane H, Clinical Assistant Professor
Health & Kinesiology
EDD, Southern Connecticut State University, 2013
MED, Temple University, 2002

Muckleroy, Martha L, Instructional Professor
Health & Kinesiology
MED, Texas A&M University, 1994

Nelson, Chad E, Instructional Assistant Professor
Health & Kinesiology
MS, Texas A&M University, 2015

Netherland, Beth M, Instructional Associate Professor
Health & Kinesiology
MS, Miami University, 2000

Nicksic, Hildi M, Clinical Assistant Professor
Health & Kinesiology
PHD, The University of Texas at Austin, 2015

Pittman, Andrew T, Clinical Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 1991

Pooley, Alexandra, Instructional Assistant Professor
Health & Kinesiology
MS, The City University London, 2011

Rahn, Rhonda N, Clinical Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2014

Riechman, Steven E, Associate Professor
Health & Kinesiology
PHD, University of Pittsburgh, 2000

Salaga, Steven H, Assistant Professor
Health & Kinesiology
PHD, University of Michigan, 2012

Sandlin, Michael E, Clinical Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 1992

Schakel, David J, Instructional Assistant Professor
Health & Kinesiology
MA, Ball State University, 1978

Shea, Charles H, Senior Professor
Health & Kinesiology
PHD, Virginia Polytechnic Institute and State University, 1978

Sherman, Ledric D, Assistant Professor
Health & Kinesiology
PHD, Texas A&M University, 2013

Shipley, Meagan M, Clinical Assistant Professor
Health & Kinesiology
PHD, Indiana University, 2014

Singer, John N, Associate Professor
Health & Kinesiology
PHD, The Ohio State University, 2002

Slagel, Kristin N, Instructional Associate Professor
Health & Kinesiology
MS, Texas A&M University, 2002

Templin, Mai Phuong L, Instructional Assistant Professor
Health & Kinesiology
MARC, University of Houston, 1992

Terral, Michael H, Lecturer
Health & Kinesiology
MED, Sam Houston State College, 1973

Thomas, Francis E, Instructional Professor
Health & Kinesiology
PHD, Texas A&M University, 1980

Thornton, John H, Executive Professor
Health & Kinesiology
PHD, Texas A&M University, 1997

Thornton, Michael A, Clinical Assistant Professor
Health & Kinesiology
EDD, Texas A&M University, 2007

Tisone, Christine, Clinical Assistant Professor
Health & Kinesiology
PHD, Indiana University, 2004

Waite, Lucy J, Instructional Associate Professor
Health & Kinesiology
MS, Texas A&M University, 2008

Walker, Dillon K, Research Assistant Professor
Health & Kinesiology
PHD, Kansas State University, 2008
Majors

Health
- Bachelor of Science in Community Health (p. 309)
- Bachelor of Science in Health, Allied Health Track (p. 311)
- Bachelor of Science in Health, School Health Track (p. 312)

Kinesiology
- Bachelor of Science in Kinesiology, All-Level Physical Education Teacher Certification Track (p. 313)
- Bachelor of Science in Kinesiology, Dance Science Track (p. 314)
- Bachelor of Science in Kinesiology, Exercise Science Track, Applied Exercise Physiology Concentration (p. 316)
- Bachelor of Science in Kinesiology, Exercise Science Track, Basic Exercise Physiology Concentration (p. 317)
- Bachelor of Science in Kinesiology, Exercise Science Track, Motor Behavior Concentration (p. 318)
- Bachelor of Science in Kinesiology and Master of Science in Athletic Training, 5-Year Degree Program (p. 319)

Sports Management
- Bachelor of Science in Sport Management, Internship Track (p. 321)
- Bachelor of Science in Sport Management, Non-Internship Track (p. 322)

University Studies
- Bachelor of Science in University Studies, Dance Concentration (p. 323)
- Bachelor of Science in University Studies, Sport Conditioning Concentration (p. 324)

Minors

The Department of Health and Kinesiology offers three minors to all students at the university. The Coaching minor and Dance minor have admission requirements. Students should consult with an advisor in the Department of Health and Kinesiology for admission requirements.

- Coaching Minor (p. 325)
- Dance Minor (p. 326)
- Sports Management Minor (p. 326)

Community Health - BS

The Bachelor of Science in Community Health prepares and educates students to serve as community health educators and promoters in a variety or government and private health agencies, clinical settings, nonprofit organizations, volunteer agencies and other community organizations. This program is unique in that it offers a wide range of approved electives permitting the student to develop a program according to his or her needs and interests. Each graduate will have knowledge enabling them to communicate health and health education needs, concerns and resources.

In addition to classroom experience, the student is exposed to pre-professional training through a non-paid, full semester internship in the final semester. This internship program provides them with on-the-job
experience and employment opportunities. Students are placed in a setting which best fits their professional goals.

**Program Requirements**

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

**First Year**

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<th>Fall</th>
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<tr>
<td>ENGL 103 or ENGL 104</td>
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<td>Introduction to Rhetoric</td>
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<td>or Composition and Rhetoric</td>
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<td>MATH 141 Finite Mathematics</td>
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<td>MATH 148 Calculus II for Biological Sciences</td>
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<td>MATH 152 Engineering Mathematics II</td>
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<td>MATH 166 Topics in Contemporary Mathematics II</td>
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<td>MATH 172 Calculus</td>
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<tr>
<td>BIOL 107 Zoology</td>
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<td>American history elective (p. 25)</td>
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<td>Creative arts elective (p. 24)</td>
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<td>Semester Credit Hours</td>
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**Spring**

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<td>COMM 205 Communication for Technical Professions</td>
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<td>MATH 131 Mathematical Concepts—Calculus</td>
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<td>MATH 142 Business Calculus</td>
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<td>MATH 147 Calculus I for Biological Sciences</td>
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<tr>
<td>MATH 151 Engineering Mathematics I</td>
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<tr>
<td>MATH 167 Explorations in Mathematics</td>
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<td>MATH 171 Analytic Geometry and Calculus</td>
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<td>PHIL 240 Introduction to Logic</td>
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<td>CHEM 101 Fundamentals of Chemistry I</td>
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<tr>
<td>&amp; CHEM 111 Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>American history elective (p. 25)</td>
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<tr>
<td>HLTH 210 Introduction to the Discipline</td>
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**Second Year**

<table>
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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>BIOL 319</td>
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<tr>
<td>Integrated Human Anatomy</td>
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<tr>
<td>and Physiology I</td>
<td></td>
</tr>
<tr>
<td>POLS 206</td>
<td>3</td>
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<tr>
<td>American National Government</td>
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</tr>
</tbody>
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1. Course should meet Core Curriculum requirement.
2. Course selection should meet the International and Cultural Diversity Graduation requirement, if needed.
3. Course meets International and Cultural Diversity graduation requirement.
4. To be chosen in consultation with academic advisor.
5. Course meets the University writing requirement.
Health - BS, Allied Health Track

The goals of the curriculum leading to a Bachelor of Science in Health are to more effectively develop literate, informed professionals capable of making the world healthier and more humane. Students receive a general education through a broad exposure to information. They also receive a specialized education through coursework designed to help them develop as a professional, expand their knowledge and skills related to health education and prepare them for professional practice. The curriculum in health offers two options: the Allied Health track and the School Health track.

The Allied Health concentration gives students a strong background in health that serves them well if they choose to pursue additional schooling in an allied health area. This concentration provides an opportunity for students to take prerequisite courses for professional allied health schools as electives while receiving a background in the health education field. Students select electives from a list of prerequisites for specific professional schools.

This program consists of two phases: pre-professional phase and professional phase. Students must meet program prerequisite requirements in order to advance to professional phase.

Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

First Year

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3-4</td>
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<td>MATH 141</td>
<td>Finite Mathematics</td>
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<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
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<td></td>
<td>MATH 172</td>
<td>Calculus</td>
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<td></td>
<td>BIOL 107</td>
<td>Zoology</td>
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<td></td>
<td>American history elective (p. 25)</td>
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<td>3</td>
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<td></td>
<td>Creative arts elective (p. 24)</td>
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Spring

Select one of the following: 3

<table>
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<th>Course Code</th>
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<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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Select one of the following: 3-4

MATH 131 Mathematical Concepts—Calculus
MATH 142 Business Calculus
MATH 143 Calculus I for Biological Sciences
MATH 151 Engineering Mathematics I
MATH 167 Explorations in Mathematics
MATH 171 Analytic Geometry and Calculus
PHIL 240 Introduction to Logic
CHEM 101 Fundamentals of Chemistry I
& CHEM 111 Fundamentals of Chemistry Laboratory I

American history elective (p. 25) 1,2 3
HLTH 210 Introduction to the Discipline 3

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
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<tr>
<td></td>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>PSYC 107</td>
<td>Introduction to Psychology</td>
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<td>HLTH 231</td>
<td>Healthy Lifestyles</td>
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<td>KINE 199</td>
<td>Required Physical Activity</td>
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Spring

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<tr>
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<td>HLTH 216</td>
<td>First Aid</td>
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<td>HLTH 240/ KINE 240</td>
<td>Computer Technology in Health and Kinesiology</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>Language, philosophy and culture elective (p. 23)</td>
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| Semester Credit Hours | 15 |

Third Year

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<td>Fall</td>
<td>HLTH 236</td>
<td>Race, Ethnicity and Health</td>
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<td>HLTH 331</td>
<td>Community Health</td>
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<td>HLTH 342</td>
<td>Human Sexuality</td>
<td>3</td>
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<td></td>
<td>HLTH 481</td>
<td>Seminar in Allied Health</td>
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<td>SOCI 205</td>
<td>Introduction to Sociology</td>
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<td></td>
<td>Free Elective</td>
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<td></td>
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Spring

<table>
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<tr>
<td>HLTH 335</td>
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<td>HLTH 354</td>
<td>Medical Terminology for the Health Professions</td>
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<td>HLTH 407</td>
<td>Global Health</td>
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Select one of the following: 3

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<tbody>
<tr>
<td>STAT 301</td>
<td>Introduction to Biometry</td>
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<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
</tr>
<tr>
<td>STAT 303</td>
<td>Statistical Methods</td>
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<tr>
<td>Semester Credit Hours</td>
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Fourth Year

**Fall**
- HLTH 353 Drugs and Society 3
- HLTH 403 Consumer Health 3
- HLTH 482 Grant Writing in Health 1
- Professional Development Electives 6
- Semester Credit Hours 13

**Spring**
- HLTH 410 Exercise and Health Programs in the Workplace 3
- HLTH 429 Environmental Health 3
- HLTH 445 Professional Practice in Health Education 2
- Professional Development Electives 5 6
- Semester Credit Hours 14

Total Semester Credit Hours 120

1 Must meet Core Curriculum requirements.
2 Course selection should meet the International and Cultural Diversity graduation requirement, if needed.
3 Course meets International and Cultural Diversity graduation requirement.
4 Meets Core Curriculum writing requirement.
5 To be chosen in consultation with your academic advisor from BICH 303, BICH 410, BIOL 112, BIOL 206, BIOL 351, CHEM 102, CHEM 112, CHEM 227, CHEM 237, CHEM 228, CHEM 238, GENE 301, GENE 310, GENE 312, NUTR 202, PHIL 111, PHIL 251, PHYS 201, PHYS 202, PSYC 306, PSYC 307 and PSYC 335/NRSC 335. Any Health course not used on the degree plan with the exception of HLTH 415, HLTH 425, HLTH 440 and HLTH 484.

Health - BS, School Health Track

The goals of the curriculum leading to a Bachelor of Science in Health are to more effectively develop literate, informed professionals capable of making the world healthier and more humane. Students receive a general education through a broad exposure to information. They also receive a specialized education through coursework designed to help them develop as a professional, expand their knowledge and skills related to health education and prepare them for professional practice. The curriculum in health offers two options: the Allied Health track and the School Health track.

The School Health option provides a background in the basic health sciences and pedagogy and prepares educators to plan, implement and evaluate health education in a variety of settings with an emphasis on teaching health in school settings. Graduates have the ability to acquire K-12 teacher certification credentials enabling them to teach health only in public or private schools although students are encouraged to become certified in a support teaching field through the use of core curriculum and support field electives. Students frequently take support field electives that also serve as course pre-requisites for professional schools such as nursing, PA, PT or other medical fields of study. Each student completes appropriate course work in academic foundations and professional education as well as participates in several field experiences representing a variety of levels and types of instruction. The program consists of three phases in the development of their professional dispositions. All students will complete a full semester of student teaching in a school setting as a culminating experience.

**Program Requirements**

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

**First Year**

**Fall**
- ENGL 103 Introduction to Rhetoric and Composition or ENGL 104 Composition and Rhetoric 3

Select one of the following:
- MATH 140 Mathematics for Business and Social Sciences 3
- MATH 141 Finite Mathematics 3
- MATH 148 Calculus II for Biological Sciences 3
- MATH 152 Engineering Mathematics II 5
- MATH 154 Calculus 1 3
- MATH 156 Calculus 3
- BIOL 107 Zoology 4
- HLTH 210 Introduction to the Discipline 3
- American history (p. 25) 3
- Semester Credit Hours 16

**Spring**
- Select one of the following: 3
  - COMM 203 Public Speaking 3
  - COMM 205 Communication for Technical Professions 3

Select one of the following: 3-4
- MATH 131 Mathematical Concepts—Calculus 4
- MATH 142 Business Calculus 3
- MATH 147 Calculus I for Biological Sciences 3
- MATH 151 Engineering Mathematics I 3
- MATH 153 Explorations in Mathematics 3
- MATH 154 Analytic Geometry and Calculus 3
- PHIL 240 Introduction to Logic 3
- CHEM 101 Fundamentals of Chemistry I 4
- CHEM 111 Fundamentals of Chemistry Laboratory I 4
- POLS 206 American National Government 3
- American history (p. 25) 3
- Semester Credit Hours 16

**Second Year**

**Fall**
- HEFB 222/KNFB 222 Teaching and Schooling in Modern Society 3
- HLTH 231 Healthy Lifestyles 3
- KINE 120 The Science of Basic Health and Fitness 1
- POLS 207 State and Local Government 3
Kinesiology - BS, All-Level Physical Education Teacher Certification Track

The Bachelor of Science degree in Kinesiology offers several options designed to prepare students for a variety of careers in public school education, exercise science and dance science. Some options also provide academic preparation for students interested in professional schools, e.g., physical therapy, occupational therapy, physician’s assistant or medicine. There are some common course requirements for all kinesiology options. Additional hours for each option are specifically designed to prepare students for that field of study. The sequencing of courses should be determined in consultation with an appropriate academic advisor.

This option is offered to students wishing to teach physical education in public or private school. The all-level certification qualifies the recipient to teach in preschool–12th grades in physical education/wellness only. This degree plan includes a full semester of student teaching in a public school setting after the completion of coursework. This degree plan will provide a program that will lead to successful completion of the certification requirements outlined by the State of Texas. Additional program information is available on the Department of Health and Kinesiology website or by contacting the advising office in the department.

Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

First Year

<table>
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<tbody>
<tr>
<td>BIOL 107</td>
<td>Zoology</td>
</tr>
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<td>4</td>
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Select one of the following:

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<tr>
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<tbody>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
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<tr>
<td>(Select one of the following)</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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Select one of the following:

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<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
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<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
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<tr>
<td>MATH 172</td>
<td>Calculus</td>
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<tr>
<td>KINE 199</td>
<td>Required Physical Activity</td>
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American history elective (p. 25)
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<th>Semester Credit Hours</th>
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<tr>
<td>Spring</td>
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<td>Select one of the following:</td>
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<tr>
<td>ENGL 103</td>
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<tr>
<td>ENGL 104</td>
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<td>ENGL 203</td>
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<td>ENGL 210</td>
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<td>MATH 131</td>
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<td>MATH 142</td>
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<td>MATH 147</td>
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<td>MATH 151</td>
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<td>PSYC 107</td>
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<td>KINE 121</td>
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<td>PHYS 201</td>
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<td>KINE 213</td>
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<td>POLS 206</td>
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<td>Spring</td>
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<tr>
<td>BIOL 319</td>
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<td>POLS 207</td>
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<td>KINE 120</td>
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<td>KNFB 222/HEFB 222</td>
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<tr>
<td>KNFB 315</td>
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**Kinesiology - BS, Dance Science Track**

The Bachelor of Science degree in Kinesiology offers several options designed to prepare students for a variety of careers in public school education, exercise science and dance science. Some options also provide academic preparation for students interested in professional schools, e.g., physical therapy, occupational therapy, physician's assistant or medicine. There are some common course requirements for all kinesiology options. Additional hours for each option are specifically designed to prepare students for that field of study. The sequencing of courses should be determined in consultation with an appropriate academic advisor.

This option is offered to prepare and educate students to enter the field of dance science. Dance Scientists are professionals who are employed by dance companies and dance training facilities throughout the world to devise effective training programs as well as advise the dancers regarding nutrition, injury prevention/care and dance psychology. Dance Scientists also become researchers, dance therapists, massage therapists and better informed dancers and teachers.

**Program Requirements**

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four
years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

### First Year
#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGL 103</td>
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<tr>
<td>or</td>
<td>or ENGL 104 Composition and Rhetoric</td>
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<td>MATH 141</td>
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<td>BIOL 107</td>
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<tr>
<td>DCED 160</td>
<td>Ballet I</td>
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<td>DCED 171</td>
<td>Modern Dance I</td>
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<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology</td>
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**Semester Credit Hours**: 17

### Spring

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<td>Business Calculus</td>
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<td>Analytic Geometry and Calculus</td>
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<td>KINE 213</td>
<td>Foundations of Kinesiology</td>
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**Semester Credit Hours**: 17

### Second Year
#### Fall

<table>
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<td>Ballet II</td>
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</tr>
<tr>
<td>DCED 172</td>
<td>Modern Dance II</td>
<td>2</td>
</tr>
<tr>
<td>KINE 201</td>
<td>Pilates Apparatus</td>
<td>2</td>
</tr>
<tr>
<td>DCED 303</td>
<td>Health Practices for Dancers</td>
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### Third Year
#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
<td>4</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>DCED 203</td>
<td>Dance Production</td>
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<tr>
<td>KINE 361</td>
<td>Movement Lab: Ballet II</td>
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<tr>
<td>KINE 372</td>
<td>Movement Lab: Modern Dance II</td>
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<tr>
<td>KINE 175</td>
<td>Gender Neutral Partnering</td>
<td>1</td>
</tr>
<tr>
<td>or KINE 199</td>
<td>Required Physical Activity</td>
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**Semester Credit Hours**: 15

### Spring

<table>
<thead>
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<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 320</td>
<td>Integrated Human Anatomy and Physiology II</td>
<td>4</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
<td>DCED 162</td>
<td>Ballet III</td>
<td>2</td>
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<tr>
<td>DCED 173</td>
<td>Modern Dance III</td>
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<tr>
<td>NUTR 202</td>
<td>Fundamentals of Human Nutrition</td>
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<tr>
<td>DCED 306</td>
<td>Dance Composition I</td>
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**Semester Credit Hours**: 16

### Fourth Year
#### Fall

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<tr>
<td>KINE 406</td>
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<tr>
<td>SPMT 304</td>
<td>Sport Psychology Management and Practice</td>
<td>3</td>
</tr>
<tr>
<td>DCED 402</td>
<td>Dance Composition III</td>
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<td>KINE 482</td>
<td>Seminar 4</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
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**Semester Credit Hours**: 12

### Spring

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<th>Credit Hours</th>
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<tbody>
<tr>
<td>DCED 202</td>
<td>Dance Appreciation 5</td>
<td>3</td>
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<tr>
<td>DCED 401</td>
<td>Dance Pedagogy</td>
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<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
<td>1</td>
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<tr>
<td>KINE 403</td>
<td>Dance Wellness</td>
<td>3</td>
</tr>
<tr>
<td>KINE 433</td>
<td>Physiology of Exercise</td>
<td>3</td>
</tr>
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</table>

**Semester Credit Hours**: 13

**Total Semester Credit Hours**: 120

---

1. Course selection should meet the International and Cultural Diversity Graduation requirement if needed.
2. Must meet Core Curriculum requirements.
3. To be chosen in consultation with your academic advisor. Students must take a specific activity.
Kinesiology - BS, Exercise Science Track, Applied Exercise Physiology Concentration

The Bachelor of Science degree in Kinesiology offers several options designed to prepare students for a variety of careers in public school education, exercise science and dance science. Some options also provide academic preparation for students interested in professional schools, e.g., physical therapy, occupational therapy, physician’s assistant or medicine. There are some common course requirements for all kinesiology options. Additional hours for each option are specifically designed to prepare students for that field of study. The sequencing of courses should be determined in consultation with an appropriate academic advisor.

The three options in exercise science expose students to a strong science background making them excellent candidates for employment opportunities in exercise related areas (cardiac rehabilitation, corporate or private fitness), advanced graduate studies (motor behavior, exercise physiology) or professional school (medical, dental or physical therapy). Course prerequisites for medical, dental or physical therapy professional schools are included in the various programs under this track.

Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>ENGL 104 or ENGL 103</td>
<td>Composition and Rhetoric or Introduction to Rhetoric and Composition</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
</tr>
<tr>
<td>MATH 172</td>
<td>Calculus</td>
</tr>
</tbody>
</table>

Spring

| Select one of the following: | 3-4 |
| MATH 131 | Mathematical Concepts—Calculus | |
| MATH 142 | Business Calculus | |
| MATH 147 | Calculus I for Biological Sciences | |
| MATH 151 | Engineering Mathematics I | |
| MATH 171 | Analytic Geometry and Calculus | |
| BIOL 112 | Introductory Biology II | 4 |
| CHEM 102 & CHEM 112 | Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II | 4 |
| Select one of the following: | | 3 |
| COMM 203 | Public Speaking | |
| COMM 205 | Communication for Technical Professions | |
| COMM 243 | Argumentation and Debate | |
| ENGL 210 | Technical and Business Writing | |
| American history elective (p. 25) | 3 |

Semester Credit Hours 17

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
</tr>
<tr>
<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
</tr>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology</td>
</tr>
<tr>
<td>KINE 121</td>
<td>Physical and Motor Fitness Assessment</td>
</tr>
<tr>
<td>American history elective (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
<tr>
<td>Semester Credit Hours 16</td>
<td></td>
</tr>
</tbody>
</table>

Spring

| PHYS 202 | College Physics | 4 |
| BIOL 320 | Integrated Human Anatomy and Physiology II | 4 |
| POLS 206 | American National Government | 3 |
| KINE 213 | Foundations of Kinesiology | 3 |
| Language, philosophy and culture elective (p. 23) | 3 |
| Semester Credit Hours 17 |

Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods or Statistical Methods</td>
</tr>
<tr>
<td>KINE 433</td>
<td>Physiology of Exercise</td>
</tr>
<tr>
<td>KINE 426</td>
<td>Exercise Biomechanics</td>
</tr>
<tr>
<td>KINE 198</td>
<td>Health and Fitness Activity</td>
</tr>
<tr>
<td>KINE 199</td>
<td>Required Physical Activity</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
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<tr>
<td>Semester Credit Hours 15</td>
<td></td>
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</tbody>
</table>

Spring

| HLTH 335 | Human Diseases | 3 |
| KINE 318 | Athletic Injuries | 3 |
| KINE 439 | Exercise Evaluation and Prescription | 5 |
| KINE 199 | Required Physical Activity | 2,4 |

| Semester Credit Hours 1 |

Creative arts elective (p. 24)
Professional Development Elective 2 3

Semester Credit Hours 14

Fourth Year

Fall
KINE 427 Therapeutic Principles 3
KINE 483 Practicum in Kinesiology 3
Professional Development Elective 2 3
Professional Development Elective 2 3
Professional Development Elective 2 3

Semester Credit Hours 15

Spring
KINE 484 Internship in Kinesiology 9

Semester Credit Hours 9

Total Semester Credit Hours 120

1 Course selection should meet the International and Cultural Diversity Graduation requirement, if needed.
2 To be chosen in consultation with your academic advisor.
3 Must meet Core Curriculum requirements.
4 Participation in band or athletics cannot be used for KINE 199 credit.
KINE 199 activities cannot be repeated for credit and must be taken for a grade.
5 Meets Core Curriculum writing requirement. Select writing intensive section of KINE 198.

Kinesiology - BS, Exercise Science Track, Basic Exercise Physiology Concentration

The Bachelor of Science degree in Kinesiology offers several options designed to prepare students for a variety of careers in public school education, exercise science and dance science. Some options also provide academic preparation for students interested in professional schools, e.g., physical therapy, occupational therapy, physician’s assistant or medicine. There are some common core course requirements for all kinesiology options. Additional hours for each option are specifically designed to prepare students for that field of study. The sequencing of courses should be determined in consultation with an appropriate academic advisor.

The three options in exercise science expose students to a strong science background making them excellent candidates for employment opportunities in exercise related areas (cardiac rehabilitation, corporate or private fitness), advanced graduate studies (motor behavior, exercise physiology) or professional school (medical, dental or physical therapy). Course prerequisites for medical, dental or physical therapy professional schools are included in the various programs under this track.

Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

First Year

Fall
ENGL 103 Introduction to Rhetoric and Composition or ENGL 104 Composition and Rhetoric 3

Select from the following: 3-4
MATH 140 Mathematics for Business and Social Sciences
MATH 141 Finite Mathematics
MATH 148 Calculus II for Biological Sciences
MATH 152 Engineering Mathematics II
MATH 166 Topics in Contemporary Mathematics II
MATH 172 Calculus
BIOL 111 Introductory Biology I 4
American history elective (p. 25) 3
Creative arts elective (p. 24) 3

Semester Credit Hours 16

Spring
Select one of the following: 3
COMM 203 Public Speaking
COMM 205 Communication for Technical Professions
COMM 243 Argumentation and Debate
ENGL 210 Technical and Business Writing

Select one of the following: 3-4
MATH 131 Mathematical Concepts—Calculus
MATH 142 Business Calculus
MATH 147 Calculus I for Biological Sciences
MATH 151 Engineering Mathematics I
MATH 171 Analytic Geometry and Calculus
BIOL 112 Introductory Biology II 4
KINE 121 Physical and Motor Fitness Assessment 2
American history elective (p. 25) 3

Semester Credit Hours 15

Second Year

Fall
CHEM 101 Fundamentals of Chemistry I
& CHEM 111 and Fundamentals of Chemistry Laboratory I 4

PHYS 201 College Physics 4
PSYC 107 Introduction to Psychology 3
POLS 206 American National Government 3

Semester Credit Hours 14

Spring
CHEM 102 Fundamentals of Chemistry II
& CHEM 112 and Fundamentals of Chemistry Laboratory II 4

PHYS 202 College Physics 4
POLS 207 State and Local Government 3
KINE 213 Foundations of Kinesiology 3
## Kinesiology - BS, Exercise Science Track, Motor Behavior Concentration

The Bachelor of Science degree in Kinesiology offers several options designed to prepare students for a variety of careers in public school education, exercise science and dance science. Some options also provide academic preparation for students interested in professional schools, e.g., physical therapy, occupational therapy, physician's assistant or medicine. There are some common course requirements for all kinesiology options. Additional hours for each option are specifically designed to prepare students for that field of study. The sequencing of courses should be determined in consultation with an appropriate academic advisor.

The three options in exercise science expose students to a strong science background making them excellent candidates for employment opportunities in exercise related areas (cardiac rehabilitation, corporate or private fitness), advanced graduate studies (motor behavior, exercise physiology) or professional school (medical, dental or physical therapy). Course prerequisites for medical, dental or physical therapy professional schools are included in the various programs under this track.

## Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

### First Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
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</tr>
<tr>
<td>ENGL 104</td>
<td>or Composition and Rhetoric</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
<td></td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
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<tr>
<td>MATH 172</td>
<td>Calculus</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<tr>
<td>AMST 110</td>
<td>American history (p. 25)</td>
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<tr>
<td>AMST 210</td>
<td>Creative arts (p. 24)</td>
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### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
<td>4</td>
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<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 237</td>
<td>and Organic Chemistry Laboratory</td>
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<tr>
<td>BIOL 351</td>
<td>Fundamentals of Microbiology</td>
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<td>KINE 198</td>
<td>Health and Fitness Activity</td>
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<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
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<tr>
<td>or STAT 303</td>
<td>or Statistical Methods</td>
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#### Spring

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
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<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 238</td>
<td>and Organic Chemistry Laboratory</td>
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</tr>
<tr>
<td>KINE 318</td>
<td>Athletic Injuries</td>
<td>3</td>
</tr>
<tr>
<td>KINE 199</td>
<td>Required Physical Activity</td>
<td>1</td>
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<td>Professional Development Elective 4</td>
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### Third Year

#### Fall

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<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
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<tr>
<td>KINE 406</td>
<td>Motor Learning and Skill Performance</td>
<td>3</td>
</tr>
<tr>
<td>KINE 427</td>
<td>Therapeutic Principles</td>
<td>3</td>
</tr>
<tr>
<td>Professional Development Elective 4</td>
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<td>3</td>
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<tr>
<td>Professional Development Elective 2</td>
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#### Spring

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<th>Course Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>GENE 301</td>
<td>Comprehensive Genetics</td>
<td>4</td>
</tr>
<tr>
<td>&amp; GENE 312</td>
<td>and Comprehensive Genetics Laboratory</td>
<td></td>
</tr>
<tr>
<td>KINE 433</td>
<td>Physiology of Exercise</td>
<td>3</td>
</tr>
<tr>
<td>KINE 426</td>
<td>Exercise Biomechanics</td>
<td>4</td>
</tr>
<tr>
<td>KINE 482</td>
<td>Seminar 3</td>
<td>1</td>
</tr>
<tr>
<td>KINE 199</td>
<td>Required Physical Activity 4.5</td>
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### Fourth Year

#### Fall

<table>
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<th>Course Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 210</td>
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<tr>
<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 237</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>KINE 198</td>
<td>Health and Fitness Activity</td>
<td>1</td>
</tr>
<tr>
<td>Professional Development Elective 4</td>
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<td>3</td>
</tr>
<tr>
<td>Professional Development Elective 2</td>
<td></td>
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</tbody>
</table>

### Total Semester Credit Hours

120

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1. Course selection should meet the International and Cultural Diversity Graduation requirement, if needed.
2. Course must meet Core Curriculum requirements.
4. To be chosen in consultation with your academic advisor.
5. Participation in band or athletics cannot be used for KINE 199 credit. KINE 199 activities cannot be repeated for credit and must be taken for a grade.
Select one of the following:  
- MATH 131 Mathematical Concepts—Calculus  
- MATH 142 Business Calculus  
- MATH 147 Calculus I for Biological Sciences  
- MATH 151 Engineering Mathematics I  
- MATH 171 Analytic Geometry and Calculus  
- BIOL 112 Introductory Biology II  
- KINE 121 Physical and Motor Fitness Assessment  
- American history (p. 25)  

**Second Year**  
**Fall**  
- CHEM 101 & CHEM 111 Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I  
- PHYS 201 College Physics  
- PSYC 107 Introduction to Psychology  
- POLS 206 American National Government  

**Spring**  
- CHEM 102 & CHEM 112 Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II  
- PHYS 202 College Physics  
- POLS 207 State and Local Government  
- KINE 213 Foundations of Kinesiology  
- Language, philosophy and culture (p. 23)  

**Third Year**  
**Fall**  
- BIOL 319 Integrated Human Anatomy and Physiology I  
- KINE 307 Lifespan Motor Development  
- KINE 198 Health and Fitness Activity  
- KINE 199 Required Physical Activity  
- SOCI 205 Introduction to Sociology  
- STAT 302 Statistical Methods or Statistical Methods  

**Spring**  
- BIOL 320 Integrated Human Anatomy and Physiology II  
- PSYC 306 Abnormal Psychology  
- KINE 318 Athletic Injuries  
- KINE 199 Required Physical Activity  
- Professional development elective  

**Fourth Year**  
**Fall**  
- KINE 406 Motor Learning and Skill Performance  
- KINE 427 Therapeutic Principles  
- PSYC 307 Developmental Psychology  
- Professional development elective  

**Professional development elective**  

**Spring**  
- KINE 426 Exercise Biomechanics  
- KINE 433 Physiology of Exercise  
- KINE 482 Seminar  
- Professional development elective  
- Professional development elective  

**Total Semester Credit Hours**  

1. Course selection should meet the International and Cultural Diversity (p. 40) Graduation requirement, if needed.  
2. Meets University writing requirement. Select writing intensive section of KINE 198.  
3. To be chosen in consultation with your academic advisor.  
4. Participation in band or athletics cannot be used for KINE 199 credit. KINE 199 activities cannot be repeated for credit and must be taken for a grade.

### Kinesiology - 5-Year Bachelor of Science/Master of Science

The dual degree program (3+2) allows undergraduate Kinesiology students to enter the Master of Science in Athletic Training program the beginning of their fourth year at Texas A&M University and earn a Bachelor of Science in Kinesiology and a Master of Science in Athletic Training (MSAT) degree in five years.

Students will follow departmental requirements for admission into the professional phase of the BS in Kinesiology. Kinesiology majors who have at least a 3.25 GPA and who will have completed all of their prescribed courses by the spring of their junior year will be eligible to apply for the five-year program.

Applicants to the five-year program will submit the same materials (including GRE scores) as other MSAT applicants by the spring deadline of their junior year, and those who meet all minimum requirements, including having earned a B or better in ATTR 201, ATTR 202, ATTR 301, ATTR 302, will receive placement in the MSAT program. The admissions criteria for the five-year program will be the same as for other MSAT students.

Students continuing into the 4th year of the 3+2 program must finish the entire 156 hours to obtain both the Bachelor’s and Master’s degrees. Students will be conferred with two degrees once they complete the 5th year of the concurrent program.

Students in the 3+2 program will be required to complete the same two-year, 60 hour curriculum as other students admitted to the MSAT program. Students will take 96 hours of undergraduate courses, and 60 hours of graduate course work, of which 24 hours will be applied to the undergraduate degree. Students are required to maintain a 3.25 GPA through the first 24 hours of graduate course work at which time the student must maintain a 3.0 GPA. Students continuing in the 3+2 program will change from U4 to G7 status when they complete 96 hours.

Students not accepted or unable to continue with the 3+2 program may complete the remaining requirements for the BS degree in Kinesiology in a concentration that is most suitable to their needs (e.g., Motor
Behavior, Applied Exercise Physiology). These students may apply to the traditional (4+2) graduate degree program.

### Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the dual degree program. The undergraduate portion of the plan is a suggested plan and should be followed closely. There may be some modifications in course order that can occur but students should consult with the departmental academic advisor for the dual degree program before changes are made in order to ensure they are meeting all dual degree requirements.

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
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<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
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<tr>
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<td>MATH 141</td>
<td>Finite Mathematics</td>
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<td></td>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
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<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>MATH 166</td>
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<td>MATH 172</td>
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<td></td>
<td>KINE 121</td>
<td>Physical and Motor Fitness Assessment</td>
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<td>KINE 199</td>
<td>Required Physical Activity (Major Aerobic Movement)</td>
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<td>COMM 243</td>
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<td>Business Calculus</td>
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<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
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<td>KINE 213</td>
<td>Foundations of Kinesiology</td>
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<td></td>
<td>KINE 198</td>
<td>Health and Fitness Activity (p. 25)</td>
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<td>BIOL 319</td>
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#### Third Year

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<td>HLTH 354</td>
<td>Medical Terminology for the Health Professions</td>
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<td>NUTR 202</td>
<td>Fundamentals of Human Nutrition</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>Field Experience in Athletic Training II</td>
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<td>KINE 426</td>
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<td>Physiology of Exercise</td>
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<td>KINE 482</td>
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<td>ATTR 651</td>
<td>Clinical Education I</td>
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<td>ATTR 660</td>
<td>Prevention and Care of Athletic Injuries</td>
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#### Fourth Year

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<td>ATTR 662</td>
<td>Clinical Examination and Diagnosis-Lower Extremity</td>
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<td>ATTR 663</td>
<td>Clinical Examination and Diagnosis-Lower Extremity Lab</td>
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<td>ATTR 668</td>
<td>Therapeutic Modalities</td>
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<td>ATTR 669</td>
<td>Therapeutic Modalities Lab</td>
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<td>KINE 601</td>
<td>Reading Research Publications in Kinesiology</td>
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</table>
**Sport Management - BS, Internship Track**

The Bachelor of Science degree in Sport Management is designed to prepare students for careers as administrators and managers in athletic, health and country clubs, as well as entry-level management positions in college and professional athletic organizations. Through this program, students are prepared for a diversity of roles in the areas of sport marketing and promotions, facility management and planning, activity programming and events management. Students may elect the option that requires completion of an internship or may select the non-internship option. The internship, following coursework, provides students with on-the-job experience and networking opportunities. Students in the internship option will have also completed a business minor. The non-internship option allows students to study sport management from a specific perspective with the goal of continued educational experiences in graduate or professional school, obtaining a post-baccalaureate internship or securing an entry-level position in a sport organization. Students in the non-internship option must complete 2 minors/cognates from a list of approved minors/cognates (i.e., business, journalism, speech communications, etc.). There are common course requirements for both tracks.

### Program Requirements

This degree plan shows students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner, and meeting all grade requirements.

#### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
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<tr>
<td>Select one of the following:</td>
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<td>3-4</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
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<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
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<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td></td>
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<tr>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 172</td>
<td>Calculus</td>
<td></td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<tr>
<td>Life and physical sciences elective (p. 22)</td>
<td>3-4</td>
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<tr>
<td>American history elective (p. 25)</td>
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**Spring**

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<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
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<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
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</tr>
<tr>
<td>SPMT 217</td>
<td>Foundations of Sport Management</td>
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<tr>
<td>Semester Credit Hours</td>
<td>16</td>
<td></td>
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</tbody>
</table>

1. To be chosen in consultation with academic advisor.
2. Participation in band or athletics cannot be used for KINE 199 credit. KINE 199 activities cannot be repeated for credit and must be taken for a grade.
3. Course must meet core curriculum requirements.
4. Meets core curriculum writing requirement.
5. Select writing intensive section of KINE 198.
6. Course selection should meet the International and Cultural Diversity (p. 40) graduation requirement if needed.

Students may elect to take PHYS or CHEM courses during the Summer semester between freshman and sophomore year to reduce the Fall load.
Sport Management - BS, Non-internship Track

The Bachelor of Science degree in Sport Management is designed to prepare students for careers as administrators and managers in athletic, health and country clubs, as well as entry-level management positions in college and professional athletic organizations. Through this program, students are prepared for a diversity of roles in the areas of sport marketing and promotions, facility management and planning, activity programming and events management. Students may elect the option that requires completion of an internship or may select the non-internship option. The internship, following coursework, provides students with on-the-job experience and networking opportunities. Students in the internship option will have also completed a business minor. The non-internship option allows students to study sport management from a specific perspective with the goal of continued educational experiences in graduate or professional school, obtaining a post-baccalaureate internship or securing an entry-level position in a sport organization. Students in the non-internship option must complete 2 minors/cognates from a list of approved minors/cognates (i.e., business, journalism, speech communications, etc.). There are common course requirements for both tracks.

Program Requirements

This degree plan shows students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner, and meeting all grade requirements.

First Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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Second Year

Fall

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<th>Course Title</th>
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<tbody>
<tr>
<td>SPMT 225</td>
<td>Practical Skills for Sport Professionals</td>
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<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
<td>1-3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
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Spring

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<td>MGMT 209</td>
<td>Business, Government and Society</td>
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Second Year

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<tbody>
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<td>Sport Psychology Management and Practice</td>
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<td>SPMT 333</td>
<td>Sport Management</td>
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<td>MGMT 309</td>
<td>Survey of Management</td>
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<td>STAT 302</td>
<td>Statistical Methods</td>
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Spring

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<tbody>
<tr>
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<td>Sociology of Sport</td>
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<td>SPMT 422</td>
<td>Financing Sport Operations</td>
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<td>MKTG 409</td>
<td>Principles of Marketing</td>
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Third Year

Fall

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<tbody>
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<td>Pre-Internship Field Experiences</td>
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<td>SPMT 421</td>
<td>Legal Aspects of Sport</td>
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<td>Marketing Aspects of Sport</td>
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<td>Professional Writing Seminar</td>
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<td>FINC 409</td>
<td>Survey of Finance Principles</td>
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Spring

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<tbody>
<tr>
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</table>

Total Semester Credit Hours | 120

1 Must meet Core Curriculum requirements.
2 Course selection should meet the International and Cultural Diversity graduation requirement, if necessary.
3 To be chosen in consultation with academic advisor. Some electives may meet International and Cultural Diversity graduation requirement.
4 Courses meets University writing requirement.
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<tr>
<th>Semester</th>
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<tbody>
<tr>
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<td>Fall</td>
<td>MATH 166 Topics in Contemporary Mathematics II</td>
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<tr>
<td>Fall</td>
<td>MATH 172 Calculus</td>
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<td>POLS 206 American National Government 3</td>
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<td>Fall</td>
<td>Life and physical sciences elective (p. 22) 1 3-4</td>
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<tr>
<td>Fall</td>
<td>American history elective (p. 25) 1,2 3</td>
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<td>COMM 243 Argumentation and Debate</td>
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<td>MATH 147 Calculus I for Biological Sciences</td>
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<td>MATH 151 Engineering Mathematics I</td>
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<td>MATH 171 Analytic Geometry and Calculus</td>
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<td>SPMT 217 Foundations of Sport Management 3</td>
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<tr>
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<td>Life and physical sciences elective (p. 22) 1 3-4</td>
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<td>American history elective (p. 25) 1,2 3</td>
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<tr>
<td>Fall</td>
<td>SPMT 225 Practical Skills for Sport Professionals 3</td>
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<td>ECON 202 Principles of Economics 3</td>
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<td>KINE 120 or KINE 223 The Science of Basic Health and Fitness or Introduction to the Science of Health and Fitness 1-3</td>
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<td>POLS 207 State and Local Government 3</td>
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<td></td>
<td>Language, philosophy and culture (p. 23) 3</td>
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<td></td>
<td>Semester Credit Hours 16</td>
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<tr>
<td>Spring</td>
<td>KINE 240/ HLTH 240 Computer Technology in Health and Kinesiology or Business Information Systems Concepts 3</td>
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<td>Minor 3 3</td>
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<td>Minor 3 3</td>
</tr>
<tr>
<td></td>
<td>Creative arts elective (p. 24) 1,2 3</td>
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<tr>
<td></td>
<td>Semester Credit Hours 15</td>
</tr>
<tr>
<td>Third Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>SPMT 304 Sport Psychology Management and Practice 3</td>
</tr>
<tr>
<td></td>
<td>SPMT 333 Sport Management 3</td>
</tr>
<tr>
<td></td>
<td>STAT 302 or STAT 303 Statistical Methods or Statistical Methods 3</td>
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<td>Sport Managment Elective 4 3</td>
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<td>Minor 3 3</td>
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<td></td>
<td>Semester Credit Hours 15</td>
</tr>
<tr>
<td></td>
<td>1 Must meet Core Curriculum requirements.</td>
</tr>
<tr>
<td></td>
<td>2 Course selection should meet the International and Cultural Diversity Graduation requirement.</td>
</tr>
<tr>
<td></td>
<td>3 Students select 2 minors/cognates which range between 24 and 36 credit hours. Directed Electives range from 4-16 credit hours. See your academic advisor for a list of acceptable minors and directed electives.</td>
</tr>
<tr>
<td></td>
<td>4 To be chosen in consultation with academic advisor.</td>
</tr>
<tr>
<td></td>
<td>5 Courses meets University writing requirement.</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours 120</td>
</tr>
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</table>

### University Studies - BS, Dance Concentration

The dance concentration curriculum leads to a Bachelor of Science in University Studies. It is designed to serve students who are in good academic standing with the University (2.0+ GPR) and are specifically seeking an interdisciplinary degree plan which provides preparation in dance history and production. Students complete courses in the foundations of dance, dance production, and dance composition, and technique courses in various forms of dance. Students choose their minors. This concentration is housed in the Division of Kinesiology within the Department of Health and Kinesiology.

### Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from Texas A&M University Undergraduate Catalog.
their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>ENGL 103 or ENGL 104</td>
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</tr>
<tr>
<td></td>
<td>American History Elective (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life and Physical Science Elective (p. 22)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Social and Behavioral Science Elective (p. 25)</td>
<td>3</td>
</tr>
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<td></td>
<td>KINE/DCED Elective</td>
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<tr>
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<tr>
<td><strong>Spring</strong></td>
<td>Life and Physical Sciences Elective (p. 22)</td>
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<td>Mathematics (p. 22)</td>
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<td>KINE/DCED Elective</td>
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<td><strong>Total</strong></td>
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### Second Year

<table>
<thead>
<tr>
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<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>Communication Elective (p. 22)</td>
<td>3</td>
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<tr>
<td></td>
<td>Mathematics (p. 22)</td>
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<tr>
<td></td>
<td>POLS 206</td>
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<td></td>
<td>DCED 202</td>
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<td></td>
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<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td>POLS 207</td>
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<tr>
<td></td>
<td>KINE 120</td>
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<td>DCED 203</td>
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<td></td>
<td>Language, Philosophy and Culture Elective (p. 23)</td>
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<td>KINE/DCED Elective</td>
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<td>Elective</td>
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### Third Year

<table>
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<th>Semester</th>
<th>Course</th>
<th>Credits</th>
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<td><strong>Fall</strong></td>
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<td>Minor</td>
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</tr>
<tr>
<td></td>
<td>Elective</td>
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<td><strong>Semester Credit Hours</strong></td>
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<table>
<thead>
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<th>Course</th>
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<tr>
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<td>KINE/DCED Elective</td>
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<td></td>
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### Fourth Year

<table>
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<tr>
<td></td>
<td>KINE 199</td>
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<td>KINE/DCED Elective</td>
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<td></td>
<td>Minor</td>
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<td><strong>Semester Credit Hours</strong></td>
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<tr>
<td></td>
<td>Elective</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
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</tbody>
</table>

### Total Semester Credit Hours 120

1. Must meet Core Curriculum requirements.
2. Select electives in consultation with advisor.
3. Some electives should be selected to meet the International and Cultural Diversity graduation requirement.
5. Must be a specific activity. See advisor for required activity.

---

### University Studies - BS, Sports Conditioning Concentration

The sports conditioning concentration curriculum leads to a Bachelor of Science degree in University Studies. It is designed to serve students who are in good academic standing with the University (2.0+ GPR) and are specifically seeking an interdisciplinary degree plan which provides preparation for further study in fields or careers in coaching high performance athletes and personal training. The focus is on adult performance at collegiate, professional or fitness industry levels. Students will receive a coaching minor and will choose a second minor of their choice. This concentration is housed in the Division of Kinesiology within the Department of Health and Kinesiology.

### Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.
**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
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</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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</tr>
<tr>
<td>American History Elective (p. 25)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and Behavioral Sciences Elective (p. 25)</td>
<td>3</td>
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<tr>
<td>Creative Arts Elective (p. 24)</td>
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**Spring**

<table>
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<td>The Science of Basic Health and Fitness</td>
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</tr>
<tr>
<td>KINE 215</td>
<td>Fundamentals of Coaching</td>
<td>3</td>
</tr>
<tr>
<td>HLTH 216</td>
<td>First Aid</td>
<td>2</td>
</tr>
<tr>
<td>Mathematics (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Life and Physical Sciences Elective (p. 22)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>American History Elective (p. 25)</td>
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<td>Semester Credit Hours</td>
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**Second Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>Communication Elective</td>
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<td>Mathematics (p. 22)</td>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>KINE 121</td>
<td>Physical and Motor Fitness Assessment</td>
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<tr>
<td>KINE 199</td>
<td>Required Physical Activity</td>
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<tr>
<td>KINE 213</td>
<td>Foundations of Kinesiology</td>
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**Spring**

<table>
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<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>NUTR 202</td>
<td>Fundamentals of Human Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>Language, Philosophy and Culture Elective (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Coaching Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Minor</td>
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</tr>
<tr>
<td>Semester Credit Hours</td>
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**Third Year**

**Fall**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>KINE 306</td>
<td>Functional Anatomy for Coaches</td>
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<tr>
<td>KINE 305</td>
<td>Sport Nutrition</td>
<td>3</td>
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<tr>
<td>Coaching Elective</td>
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<tr>
<td>Minor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
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<tr>
<td>Semester Credit Hours</td>
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**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>KINE 302</td>
<td>Applied Exercise Physiology for Coaches</td>
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</tr>
<tr>
<td>KINE 307</td>
<td>Lifespan Motor Development</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>KINE 324</td>
<td>Career Development in Coaching and Youth Development</td>
<td>3</td>
</tr>
<tr>
<td>KINE 431</td>
<td>Ropes Course and Group Process</td>
<td>3</td>
</tr>
<tr>
<td>KINE 485</td>
<td>Directed Studies</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
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**Fourth Year**

**Fall**

<table>
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<tr>
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<tbody>
<tr>
<td>KINE 318</td>
<td>Athletic Injuries</td>
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<tr>
<td>KINE 386</td>
<td>Sport Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINE 482</td>
<td>Seminar</td>
<td>6</td>
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<td>SPMT 421</td>
<td>Legal Aspects of Sport</td>
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<td>Minor</td>
<td>3</td>
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<tr>
<td>Elective</td>
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<tr>
<td>Semester Credit Hours</td>
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**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINE 404</td>
<td>Coaching Psychology</td>
<td>3</td>
</tr>
<tr>
<td>KINE 483</td>
<td>Practicum in Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours** | 120

1. Must meet Core Curriculum requirements.
2. Some electives should meet the International and Cultural Diversity graduation requirement.
4. Must be a specific activity class. See advisor for appropriate course.
5. Select electives in consultation with advisor.

**Coaching - Minor**

This minor is also useful to those who work with youth in sports leagues. Admission to this minor is by application only. Consult with an advisor in the Department of Health and Kinesiology for admission requirements and application. Students should allow a minimum of three semesters to complete this minor.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>KINE 199</td>
<td>Required Physical Activity (with HKCO attribute)</td>
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<td>KINE 215</td>
<td>Fundamentals of Coaching</td>
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</tr>
<tr>
<td>HLTH 216</td>
<td>First Aid</td>
<td>2</td>
</tr>
<tr>
<td>KINE 302</td>
<td>Applied Exercise Physiology for Coaches</td>
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</tr>
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<td>KINE 306</td>
<td>Functional Anatomy for Coaches</td>
<td>1</td>
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<td>KINE 307</td>
<td>Lifespan Motor Development</td>
<td>3</td>
</tr>
<tr>
<td>KINE 318</td>
<td>Athletic Injuries</td>
<td>3</td>
</tr>
<tr>
<td>KINE 324</td>
<td>Career Development in Coaching and Youth Development</td>
<td>3</td>
</tr>
<tr>
<td>KINE 431</td>
<td>Ropes Course and Group Process</td>
<td>3</td>
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<tr>
<td>KINE 485</td>
<td>Directed Studies</td>
<td>3</td>
</tr>
<tr>
<td>KINE 482</td>
<td>Seminar</td>
<td>6</td>
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<tr>
<td>KINE 404</td>
<td>Coaching Psychology</td>
<td>3</td>
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<td>KINE 483</td>
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<td>Elective</td>
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</tr>
<tr>
<td>Semester Credit Hours</td>
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</tr>
</tbody>
</table>

Texas A&M University Undergraduate Catalog 325
Dance - Minor

Admission to the Dance minor requires an audition. Refer to the Dance Program (http://tamudance.tamu.edu) website for information on auditions.

A minor in dance can lead to numerous opportunities within the field of dance performance and education. Students can obtain the necessary tools to teach, choreograph and direct in high schools, private studios, performance groups, dance/drill teams, dance within community and/or companies, or utilize their minor studies to pursue degrees in dance. Dance is considered to be an important part of the visual and performing arts educational experience. Studies of dance performance, education and history can enhance a student’s academic experience.

Dance students are part of the Dance Program (http://tamudance.tamu.edu), and have the opportunity to participate in events throughout the year.

Performance

Performance opportunities include: an annual dance concert (Perpetual Motion), Faculty Arts Showcase, Choreographers’ Showcase, Senior Concerts, informal performances, student organization concerts, performances throughout the community and on campus and state, regional, and national/international gala performances. Dance faculty often receive grants for other performances throughout the university in collaboration with faculty from other colleges. Students are also given the opportunity to attend various festivals and conferences.

The Dance Program also offers students the capability to work with guest artists (http://dance.tamu.edu/people/guest-artists) in master classes, watching performances and learning repertory. This not only gives students an unique opportunity to build their resumes, but to work with a variety of professionals in the field.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>DCED 202</td>
<td>Dance Appreciation</td>
<td>3</td>
</tr>
<tr>
<td>DCED 203</td>
<td>Dance Production</td>
<td>3</td>
</tr>
<tr>
<td>DCED 306</td>
<td>Dance Composition I</td>
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</tr>
<tr>
<td>KINE 175</td>
<td>Gender Neutral Partnering</td>
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<td>DCED 171</td>
<td>Modern Dance I</td>
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<tr>
<td>DCED 172</td>
<td>Modern Dance II</td>
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</tr>
<tr>
<td>DCED 173</td>
<td>Modern Dance III</td>
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</tr>
<tr>
<td>KINE 271</td>
<td>Movement Lab: Modern Dance I</td>
<td></td>
</tr>
<tr>
<td>KINE 372</td>
<td>Movement Lab: Modern Dance II</td>
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<tr>
<td>KINE 473</td>
<td>Movement Lab: Modern Dance III</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

Sport Management - Minor

The minor provides a foundational understanding of the multifarious sport industry from the perspectives of management, marketing and other business principles. The minor provides an introductory understanding of the broadly defined sport management discipline and potential careers that can be leveraged in the sport industry.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>SPMT 217</td>
<td>Foundations of Sport Management</td>
<td>3</td>
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<tr>
<td>Select three of the following:</td>
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<tr>
<td>SPMT 230</td>
<td>Introduction to Leadership in Sport Organizations</td>
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<tr>
<td>SPMT 304</td>
<td>Sport Psychology Management and Practice</td>
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<tr>
<td>SPMT 319/ SOCI 319</td>
<td>Sociology of Sport</td>
<td></td>
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<tr>
<td>SPMT 330</td>
<td>Application of Leadership Skills in Sport Organizations</td>
<td></td>
</tr>
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<td>SPMT 336</td>
<td>Diversity in Sport Organizations</td>
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<td>SPMT 337</td>
<td>International Sport Business</td>
<td>2</td>
</tr>
<tr>
<td>SPMT 340</td>
<td>Sport Governance</td>
<td></td>
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</tbody>
</table>

Total Semester Credit Hours 15

1. Topics for the seminar classes include: Sport Sponsorship, Athletic Administration and Sport and the Media.
2. Courses meet International and Cultural Diversity requirement

Students must make a grade of "C" or better in all courses.

Department of Teaching, Learning and Culture

The Department of Teaching, Learning and Culture is responsible for undergraduate programs that lead to certification at the early childhood/elementary, middle and secondary levels. Note these exceptions:

1. students interested in teaching either health or physical education must major in the Department of Health and Kinesiology;
2. students interested in teaching agricultural science must major in the Department of Agricultural Education;
3. students interested in secondary certification can be certified through the secondary graduate certification program, the secondary
accelerate certification program, the University Studies program or the Aggie Teach program.

**Early Childhood/Elementary or Middle Grades Certification**

Baccalaureate Degree Programs. Most students interested in early childhood/elementary (PreK-6) or middle school (4–8) certification pursue a program leading to the Bachelor of Science degree (BS) with a major in interdisciplinary studies (INST). The INST degree certification programs prepare students for the many diverse instructional roles assumed by public school teachers. A minimum of 123 credit hours is required for the INST degree. Within this program, students may focus on:

1. early childhood (PreK–grade 6);
2. middle school (grades 4–8 math and science); and
3. middle school (grades 4–8 English language arts and social studies).

For complete information, see an advisor in the Department of Teaching, Learning and Culture’s Office of Undergraduate Advising in Heaton Hall.

There is another baccalaureate elementary certification program available for students majoring in English. For information about this program, see an advisor in the Department of English, College of Liberal Arts.

Eligibility. Students must meet the requirements for a bachelor’s degree in the college and in the department in which they are majoring. Further, they must meet specific admission and performance standards established by the Department of Teaching, Learning and Culture as well as requirements for professional education and certification established by the State of Texas. These requirements include admission to teacher education, admission to student teaching and qualification for initial certification. It is the responsibility of the student to contact the Department of Teaching, Learning and Culture’s Office of Undergraduate Advising for specific information pertaining to program changes.

**Requirements for Admission to Teacher Education Early Childhood/Elementary or Middle Grades Certification Programs**

Please see an advisor in the Department of Teaching, Learning and Culture’s Office of Undergraduate Advising for current information.

**Requirements for Admission to Teaching Education Early Childhood/Elementary and Middle Grades Education Program**

1. Pass the THEA, ACCUPLACER, ASSET or COMPASS test or show proof of exemption from the test with appropriate STAAR, SAT or ACT scores.
2. Completion of a minimum 42 hours of pre-professional coursework from degree program (includes University Core Curriculum courses).
3. Completion of a minimum of 32 hours of University Core Curriculum courses with no grade lower than a C.
4. Completion of TEFB 273 or INST 210 with a grade of B or higher (equivalent courses from a community college may be substituted).
5. Completion of English Proficiency grade requirement by earning a B/C grade combination in ENGL 103 or ENGL 104 and one of the following courses: ENGL 203 or ENGL 210.
6. A GPR of 2.75 on all coursework on a degree plan with no grade lower than a C.
7. Transcripts for all institutions of higher education on file in the Texas A&M University Office of the Registrar.
8. Approved and signed degree plan on file in the Advising Office of the Department of Teaching, Learning and Culture.

These requirements must be seen as minimum standards only. Successful fulfillment of all of the above requirements does not guarantee admission to the program. Admission also depends upon the number of places available and the number of applications received each year. If more qualified students apply than the available number of spaces, admission may be based on selection factors at the time of application, such as GPA in pre-professional courses, number of hours needed to complete the program, and enrollment in prerequisite courses.

**Secondary Graduate Certification Program**

Four routes leading to initial teacher certification at the secondary level are available. These include the Aggie Teach program, the University Studies program, the graduate certification program and Accelerate (an alternative certification program). Complete information is available from the TLAC advising office in Heaton Hall.

**Requirements for Admission to Student Teaching**

1. Complete a student teaching application by the given deadlines and complete all coursework prior to senior methods. Students must see their advisors for deadlines.
2. Admission to teacher education.
3. Completion of all courses listed on the degree plan. All Education/Interdisciplinary Studies and professional courses with a grade of C or better.
4. All certification coursework must be completed. Each emphasis/teaching field must have a grade of C or better in each course with a minimum GPR of 2.75 in teacher emphasis/teaching field.
5. ENGL 203 or ENGL 210 must be completed with a grade of C or better.
6. A minimum of 2.75 on all coursework completed at Texas A&M.
7. A minimum of 2.75 on all coursework that applies to the degree plan, taken at Texas A&M.
8. A minimum of 2.75 on all coursework that applies to the emphasis/teaching field, taken at Texas A&M.

**Faculty**

Ashley, Candice R, Lecturer
Teaching, Learning And Culture
PHD, Capella University, 2014

Burghardt, Beatrix, Visiting Assistant Professor
Teaching, Learning And Culture
PHD, Indiana University, 2015
Burlbaw, Lynn M, Professor
Teaching, Learning And Culture
PHD, The University of Texas at Austin, 1989

Caldwell, Heather L, Instructional Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2009

Cantrell, Emily S, Clinical Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2008

Capraro, Mary M, Professor
Teaching, Learning And Culture
PHD, University of Southern Mississippi, 2000

Capraro, Robert M, Professor
Teaching, Learning And Culture
PHD, University of Southern Mississippi, 2000

Carter, Jeanne M, Assistant Lecturer
Teaching, Learning And Culture
MS, University of North Texas, 2011
MED, Sam Houston State University, 1997

Carter, Norvella P, Professor Emeritus
Teaching, Learning And Culture
PHD, Loyola University Chicago, 1990

Cassell, Edith C, Clinical Associate Professor
Teaching, Learning And Culture
PHD, Purdue University, 2007

Clark, Robert M, Assistant Lecturer
Teaching, Learning And Culture
PHD, Texas A&M University, 2010

Craig, Cheryl J, Professor
Teaching, Learning And Culture
PHD, University of Alberta, Canada, 1992

Davis, Trina J, Associate Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2005

De Miranda, Michael A, Professor
Teaching, Learning And Culture
PHD, University of California, Riverside, 1996

Deuermeyer, Elizabeth E, Lecturer
Teaching, Learning And Culture
PHD, Texas A&M University, 2016

Dixon, Laurie Q, Associate Professor
Teaching, Learning And Culture
PHD, Harvard Graduate School of Education, 2004

Fleming, Kenneth J, Assistant Lecturer
Teaching, Learning And Culture
PHD, Texas A&M University, 2016

Frieda, Dianna R, Assistant Lecturer
Teaching, Learning And Culture
MS, Texas A&M University, 1984

Ging, Amy E, Assistant Lecturer
Teaching, Learning And Culture
MS, Texas Woman's University, 2008

Goldsby, Dianne S, Clinical Professor
Teaching, Learning And Culture
PHD, University of New Orleans, 1994

Griffith, Karee, Lecturer
Teaching, Learning And Culture
PHD, University of Mary Hardin-Baylor, 1993

Hammer, Janet E, Clinical Professor
Teaching, Learning And Culture
PHD, The University of Texas at Austin, 2003

Helfeldt, John P, Professor
Teaching, Learning And Culture
PHD, Syracuse University, 1973

Hill-Jackson, Valerie L, Clinical Professor
Teaching, Learning And Culture
PHD, St. Joseph's University, 2003

Howe, Roger, Professor
Teaching, Learning And Culture
PHD, University of California, Berkeley, 1969

Hutchins, Shaun D, Lecturer
Teaching, Learning And Culture
PHD, Colorado State University, 2015

James, Marlon C, Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2008

Jolly, Ashley G, Assistant Lecturer
Teaching, Learning And Culture
MED, Sam Houston State University, 2007

Joshi, R M, Professor
Teaching, Learning And Culture
PHD, University of South Carolina, 1976

Kelly, Larry J, Clinical Professor
Teaching, Learning And Culture
PHD, The University of Texas at Austin, 2002

Kulm, Gerald, Senior Professor
Teaching, Learning And Culture
PHD, Columbia University, 1971

Kuo, Li-Jen, Associate Professor
Teaching, Learning And Culture
PHD, University of Illinois at Urbana-Champaign, 2006

Larke, Patricia J, Research Scientist
Teaching, Learning And Culture
EDD, University of Missouri - Columbia, 1985

Larrison, Lucy E, Lecturer
Teaching, Learning And Culture
PHD, Texas A&M University, 2006
Laub, James D, Clinical Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2012

Li, Yeping, Professor
Teaching, Learning And Culture
PHD, University of Pittsburgh, 1999

Madden, Linda D, Assistant Lecturer
Teaching, Learning And Culture
MED, Sam Houston State University, 1997

Matsuda, Noboru, Associate Professor
Teaching, Learning And Culture
PHD, University of Pittsburgh, 2004

Matthews, Sharon D, Clinical Assistant Professor
Teaching, Learning And Culture
PHD, New Mexico State University, 2007

Middlebrooks, Mary W, Assistant Lecturer
Teaching, Learning And Culture
PHD, Sam Houston State University, 1973

Moro, Fabio, Lecturer
Teaching, Learning And Culture
PHD, Texas A&M University, 2005

Neshyba, Monica V, Clinical Assistant Professor
Teaching, Learning And Culture
PHD, The University of Texas at Austin, 2012

Ogletree, Quinita D, Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2012

Parker, Dawn R, Clinical Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 1997

Peltier, Tiffany K, Assistant Lecturer
Teaching, Learning And Culture
MED, Texas A&M University, 2016

Rackley, Robin A, Clinical Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2004

Raven, Sara P, Assistant Professor
Teaching, Learning And Culture
PHD, University of Georgia, 2013

Rife, Kimberly G, Assistant Lecturer
Teaching, Learning And Culture
MED, Texas A&M University, 2016

Rupley, William H, Professor
Teaching, Learning And Culture
PHD, University of Illinois at Urbana-Champaign, 1975

Schluens, Amber D, Assistant Lecturer
Teaching, Learning And Culture
MED, Sam Houston State University, 2006

Shimek, Christina M, Lecturer
Teaching, Learning And Culture
PHD, Texas A&M University, 2012

Shumbera, Kristen L, Assistant Lecturer
Teaching, Learning And Culture
MS, University of Florida, 2007

Singleton, Julie A, Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2011

Slattery, George P, Professor
Teaching, Learning And Culture
PHD, Louisiana State University, 1989

Taylor, Bart, Assistant Lecturer
Teaching, Learning And Culture
MED, Lamar University, 2011

Taylor, Brenda K, Assistant Lecturer
Teaching, Learning And Culture
PHD, Texas Woman's University, 1984

Thomas, Rebecca S, Instructional Assistant Professor
Teaching, Learning And Culture
MED, Texas A&M University, 1998

Townsend, Cheryl C, Assistant Lecturer
Teaching, Learning And Culture
MED, Sam Houston State University, 2010

Viruru, Radhika, Clinical Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 1998

Walters, Lynne M, Associate Professor
Teaching, Learning And Culture
PHD, University of Wisconsin - Madison, 1977

Waxman, Hersholt C, Professor
Teaching, Learning And Culture
PHD, University of Illinois at Chicago, 1982

Wijekumar, Kausalai, Professor
Teaching, Learning And Culture
PHD, The Pennsylvania State University, 2000

Yalvac, Bugrahan, Associate Professor
Teaching, Learning And Culture
PHD, The Pennsylvania State University, 2005

Majors

- Bachelor of Science in Interdisciplinary Studies, English Language Arts/Social Studies, Middle Grades Certification (p. 330)
- Bachelor of Science in Interdisciplinary Studies, Math/Science, Middle Grades Certification (p. 331)
- Bachelor of Science in Interdisciplinary Studies, Pre-K-6, Generalist Certification (p. 332)

Certification

- Secondary Graduate Certification Program (p. 333)
## Minors
- Applied Learning-Science, Technology, Engineering and Mathematics (STEM) Minor (p. 334)

## Interdisciplinary Studies, BS, English Language Arts/Social Studies, Middle Grades Certification

Programs in the Department of Teaching, Learning and Culture are based upon new State of Texas standards. You must consult with an advisor in the Department of Teaching, Learning and Culture (Heaton Hall) prior to enrolling in coursework each semester or term.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 103 or ENGL 104</td>
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<tr>
<td>GEOG 201 or GEOG 202</td>
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<tr>
<td>HIST 105</td>
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<tr>
<td>MATH 141 or MATH 166</td>
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<td>TEFB 273</td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 203 or ENGL 210 or ENGL 210</td>
<td>3</td>
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<tr>
<td>HIST 106</td>
<td>3</td>
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<tr>
<td>MATH 142 or MATH 166 or MATH 166</td>
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<tr>
<td>Creative arts (p. 24)</td>
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<th>Summer</th>
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<td>EPSY 435 or STAT 303</td>
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<td>HIST 352 or ASIA 352</td>
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#### Second Year

<table>
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<td>ENGL 227 or ENGL 228</td>
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<tr>
<th>Spring</th>
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<tbody>
<tr>
<td>EDCI 354</td>
<td>3</td>
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<tr>
<td>INST 363</td>
<td>3</td>
</tr>
<tr>
<td>MASC 351</td>
<td>3</td>
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<tr>
<td>RDNG 371</td>
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#### Third Year

<table>
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<td>EDCI 365</td>
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<tr>
<td>INST 362</td>
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<tr>
<td>MASC 351</td>
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<td>RDNG 371</td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDCI 354</td>
<td>3</td>
</tr>
<tr>
<td>INST 363</td>
<td>3</td>
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<tr>
<td>RDNG 472</td>
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<td>TEFB 371</td>
<td>3</td>
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#### Fourth Year

<table>
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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>MEFB 452</td>
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<tr>
<td>MEFB 450</td>
<td>3</td>
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</tbody>
</table>

### Additional Programs

- **History of Texas or Texas as Border Region**
- **Understanding Special Populations**
- **State and Local Government**
- **Geography of the United States**
- **Foundations of Education in a Multicultural Society**
- **The Science of Basic Health and Fitness**
- **Problem Solving in Mathematics**
- **Multicultural and Interdisciplinary Literature for Middle Grades**
- **Educational Statistics or Statistical Methods**
- **Modern East Asia**
- **Using Technology Classrooms**
- **Early Childhood through Adolescent Education**
- **English as a Second Language Methods I**
- **Interest Groups**
- **Reading and Writing across the Middle Grades Curriculum**
- **Early Childhood and Adolescent Curriculum and Lesson Design**
- **English as a Second Language Methods II**
- **Essential Foundations of Language and Literacy for All Learners**
- **Teaching Writing in Elementary and Middle Grade Classrooms**
- **Dynamics and Management in Multicultural/Inclusionary Learning Environments**
- **Curriculum and Instruction for Middle Grades**
- **Social Studies Methods in the Middle Grades**
American history elective to be chosen from HIST 352, HIST 355, HIST 356, HIST 359, HIST 361, HIST 362, HIST 363, HIST 374, HIST 412, HIST 421, HIST 455, HIST 456, HIST 460, HIST 461, HIST 473.

Government/political science elective must be satisfied by 3 hours chosen from POLS 314, POLS 315, POLS 316, POLS 317 or POLS 319, and 3 hours chosen from POLS 229, POLS 231, POLS 347, POLS 369 or POLS 415.

**Interdisciplinary Studies, BS, Math/Science, Middle Grades Certification**

Programs in the Department of Teaching, Learning and Culture are based upon new State of Texas standards. You must consult with an advisor in the Department of Teaching, Learning and Culture (Heaton Hall) prior to enrolling in coursework each semester or term.

**Program Requirements**

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 111 or BIOL 113</td>
<td>Introductory Biology I or Essentials in Biology</td>
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<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td>HIST 105 or HIST 106</td>
<td>History of the United States or History of the United States</td>
<td>3</td>
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<tr>
<td>MATH 141 or MATH 166</td>
<td>Finite Mathematics or Topics in Contemporary Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>Introduction to Culture, Community, Society and Schools</td>
<td>3</td>
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<td><strong>Total Semester Credit Hours</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ANTH 205</td>
<td>Peoples and Cultures of the World</td>
<td>3</td>
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<tr>
<td>BIOL 107</td>
<td>Zoology</td>
<td>4</td>
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<tr>
<td>ENGL 203 or ENGL 210</td>
<td>Writing about Literature or Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>HIST 226 or HIST 416</td>
<td>History of Texas or Texas as Border Region</td>
<td>3</td>
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<tr>
<td>MATH 131 or MATH 142</td>
<td>Mathematical Concepts—Calculus or Business Calculus</td>
<td>3</td>
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<td><strong>Total Semester Credit Hours</strong></td>
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**Summer**

<table>
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<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>PHYS 205</td>
<td>Concepts of Physics</td>
<td>4</td>
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</table>

**Second Year**

**Fall**

Select one of the following:

- GEOG 203 & GEOG 213: Planet Earth and Planet Earth Lab
- GEOL 101: Principles of Geology
- MASC 351: Problem Solving in Mathematics
- MATH 365: Structure of Mathematics I
- POLS 207: State and Local Government
- Elective

**Spring**

Select one of the following:

- CHEM 101 & CHEM 111: Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I
- CHEM 106 & CHEM 116: Molecular Science for Citizens and Molecular Science for Citizens Laboratory
- INST 210: Understanding Special Populations
- INST 222: Foundations of Education in a Multicultural Society
- MASC 371: Inquiries in Life and Earth Sciences
- MATH 366: Structure of Mathematics II
- STAT 303: Statistical Methods

**Third Year**

**Fall**

- EDCI 365: Using Technology Classrooms
- EDCI 353: Early Childhood through Adolescent Education
- INST 362: English as a Second Language Methods I
- KINE 120: The Science of Basic Health and Fitness
- RDNG 468: Essential Foundations of Language and Literacy for All Learners
- MASC 475: Inquiries in Physical Science

**Spring**

- EDCI 354: Early Childhood and Adolescent Curriculum and Lesson Design
- INST 363: English as a Second Language Methods II
- MASC 450: Integrated Mathematics
- RDNG 371: Multicultural and Interdisciplinary Literature for Middle Grades
- TEFB 371: Dynamics and Management in Multicultural/Inclusionary Learning Environments
Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MEFB 452</td>
<td>Curriculum and Instruction for Middle Grades</td>
<td>3</td>
</tr>
<tr>
<td>MEFB 460</td>
<td>Math Methods in Middle Grades</td>
<td>3</td>
</tr>
<tr>
<td>MEFB 470</td>
<td>Science Methods in Middle Grades</td>
<td>3</td>
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<tr>
<td>RDNG 490</td>
<td>Assessment in Reading Instruction in Middle Grades</td>
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Semester Credit Hours: 12

Spring

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MEFB 497</td>
<td>Supervised Clinical Teaching</td>
<td>6</td>
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</table>

Semester Credit Hours: 6

Total Semester Credit Hours: 126

Interdisciplinary Studies - BS, Pre-K-6, Generalist Certification

Programs in the Department of Teaching, Learning and Culture are based upon new State of Texas standards. Students should check with the advisors in the appropriate departments to receive the most current programs, policies and procedures.

Program Requirements

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>HIST 105 or HIST 106</td>
<td>History of the United States or History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>MATH 141 or MATH 166</td>
<td>Finite Mathematics or Topics in Contemporary Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>Introduction to Culture, Community, Society and Schools</td>
<td>3</td>
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Semester Credit Hours: 15

Spring

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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</tr>
<tr>
<td>GEOG 202</td>
<td>Geography of the Global Village</td>
<td>3</td>
</tr>
<tr>
<td>HIST 226</td>
<td>History of Texas</td>
<td>3</td>
</tr>
<tr>
<td>MATH 131 or MATH 142</td>
<td>Mathematical Concepts—Calculus or Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASC 351</td>
<td>Problem Solving in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 365</td>
<td>Structure of Mathematics I</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 4

Select one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 203 &amp; GEOG 213</td>
<td>Planet Earth and Planet Earth Lab</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 101</td>
<td>Principles of Geology</td>
<td>3</td>
</tr>
<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>Creative arts elective (p. 24)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 16

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INST 222</td>
<td>Foundations of Education in a Multicultural Society</td>
<td>3</td>
</tr>
<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
<td>1</td>
</tr>
<tr>
<td>MASC 371</td>
<td>Inquiries in Life and Earth Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 366</td>
<td>Structure of Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>RDNG 351</td>
<td>Reading in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>RDNG 361</td>
<td>Assessment in Reading Instruction</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 16

Summer

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPSY 435 or STAT 303</td>
<td>Educational Statistics or Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 6

Third Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INST 362</td>
<td>English as a Second Language Methods I</td>
<td>3</td>
</tr>
<tr>
<td>RDNG 461</td>
<td>Teaching Reading Through Children's Literature</td>
<td>3</td>
</tr>
<tr>
<td>EDCI 365</td>
<td>Using Technology Classrooms</td>
<td>3</td>
</tr>
<tr>
<td>EDCI 353</td>
<td>Early Childhood through Adolescent Education</td>
<td>3</td>
</tr>
<tr>
<td>HIST 319</td>
<td>U.S. Immigration and Ethnicity</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDCI 354</td>
<td>Early Childhood and Adolescent Curriculum and Lesson Design</td>
<td>3</td>
</tr>
<tr>
<td>INST 363</td>
<td>English as a Second Language Methods II</td>
<td>3</td>
</tr>
<tr>
<td>MASC 475</td>
<td>Inquiries in Physical Science</td>
<td>3</td>
</tr>
<tr>
<td>RDNG 468</td>
<td>Essential Foundations of Language and Literacy for All Learners</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 371</td>
<td>Dynamics and Management in Multicultural/Inclusionary Learning Environments</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15

Summer

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 361</td>
<td>Technology and Engineering in Western Civilization, 1400-Present</td>
<td>3</td>
</tr>
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</table>

Semester Credit Hours: 3

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDNG 467</td>
<td>Reading and the Language Arts</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 410</td>
<td>Social Studies and the Humanities in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 412</td>
<td>Mathematics in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 413</td>
<td>Science in the Elementary School</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 12
Secondary Graduate Certification Program

This program is designed for those candidates who have completed the baccalaureate degree and desire initial certification at the secondary level. Candidates are admitted upon recommendation of departmental advisors and progress through summer, fall and spring as a cohort. The certification program requires completion of 21 graduate semester credit hours and the successful completion of appropriate State examinations. A full public school year internship and the opportunity to apply all coursework toward the Master of Education degree are unique features of this program. The candidate may, upon approval by the department and a cooperating school district, serve as an intern in a full-time salaried teacher of record position, in a part-time salaried teaching position, or as a paid substitute teacher. All candidates will serve a full public school year internship whether in a salaried or non-salaried position.

Prerequisites

Completion of the following prior to the first summer session:

1. Baccalaureate degree from an accredited institution with a GPR of 2.75.

2. Coursework for one teaching field as approved by the teaching field advisor.

3. Pass the appropriate content area TExES exam.

Secondary Certification Through Accelerate Online Program

This program is designed for those candidates who have completed the baccalaureate degree and desire initial certification at the secondary level. The program is designed to provide college graduates with a program of teacher preparation that can be completed in 12-18 months. The Accelerate Online program provides an individual with the flexibility of completing teacher certification through online instructional modules followed by a year-long paid internship in a secondary public school in Texas. Other information and additional program requirements can be obtained from Lynn Beason at lbeason@coe.tamu.edu or (979) 458-3968.

Secondary Certification Through the Aggie Teach Program

Contact the Aggie Teach advisor in the office of the Associate Dean, College of Science.

Secondary Certification Through the University Studies Program

Contact the TLAC Advising Office in Heaton Hall and the University Studies advisor in the Office of General Academic Programs in Hotard Hall.
Applied Learning in Science, Technology, Engineering and Mathematics (STEM) Minor

The College of Education and Human Development offers a minor in Applied Learning in Science, Technology, Engineering and Mathematics (STEM).

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEED 302</td>
<td>Teaching/Learning Processes: Psychological Perspectives on Education or INST 210 or Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 322</td>
<td>Teaching and Schooling in Modern Society</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 324</td>
<td>Teaching Skills II</td>
<td>3</td>
</tr>
<tr>
<td>RDNG 372</td>
<td>Reading and Writing across the Middle Grades Curriculum or RDNG 46 or Reading in the Middle and Secondary Grades</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 406</td>
<td>Science in the Middle and Secondary School or TEFB 407 or Mathematics in the Middle and Senior School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>Introduction to Culture, Community, Society and Schools or INST 222 or Foundations of Education in a Multicultural Society</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

A 2.5 GPA is required in minor courses to pursue teacher certification.

Substitutions must be approved by the Department of Teaching, Learning and Culture advisors.

University Studies Programs

The College of Education and Human Development offers degrees in University Studies. A University Studies degree differs from a traditional "major" in that it consists of a concentration and two minors of 15-18 hours each. The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

Majors

- Bachelor of Science in University Studies, Child Professional Services Non-Certification Program (p. 300)
- Bachelor of Science in University Studies, Dance Concentration (p. 323)
- Bachelor of Science in University Studies, Sport Conditioning Concentration (p. 324)

University Studies - BS, Child Professional Services Concentration

The Department of Educational Psychology offers an undergraduate non-certification degree program in University Studies with an area of concentration in Child Professional Services. This degree is a flexible 120-hour degree program that enables a student to combine a prescribed concentration, two minors, the core curriculum and electives to create a comprehensive degree that aligns with the student’s individual professional interest. The Child Professional Services non-certification concentration requires students to complete a minor in Human Resource Development or Creative Studies and Sociology. This concentration does not allow students to seek teacher certification; however, it offers study in upper level education courses that provides a strong foundation in child and adolescent development, instructional methods, educational psychology, kinesiology, human resource development, and sociology as a means of preparing graduates for careers in civic, social or religious organizations; hospitals or non-profit organizations; or family and community services. Students interested in University Studies - Child Professional Services should contact the EPSY undergraduate advisor located in Heaton Hall.

Program Requirements

The following curriculum leads to a Bachelor of Science degree in University Studies with an area of concentration in Child Professional Services. Students are required to meet with their assigned academic advisor prior to registration each semester.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the United States</td>
</tr>
<tr>
<td>MATH 141 or MATH 166</td>
<td>Finite Mathematics or Topics in Contemporary Mathematics II</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
</tr>
<tr>
<td>Life and Physical sciences elective (p. 22)</td>
<td>4</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>16</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Select one of the following:</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
</tr>
<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
<tr>
<td>HIST 106 or HIST 226</td>
<td>History of the United States or History of Texas</td>
</tr>
<tr>
<td>Life and Physical sciences elective (p. 22)</td>
<td>4</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>16</td>
</tr>
</tbody>
</table>
### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHRD 203</td>
<td>Foundations of Human Resource Development</td>
<td>3</td>
</tr>
<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>INST 222</td>
<td>Foundations of Education in a Multicultural Society</td>
<td>3</td>
</tr>
<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
<td>1</td>
</tr>
<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SOCI minor elective</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 16

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHRD 210</td>
<td>Legal and Ethical Environment of Human Resource Development</td>
<td>3</td>
</tr>
<tr>
<td>EPFB 210</td>
<td>Family Involvement and Empowerment</td>
<td>3</td>
</tr>
<tr>
<td>EPSY 435</td>
<td>Educational Statistics</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>Introduction to Culture, Community, Society and Schools</td>
<td>3</td>
</tr>
<tr>
<td>SOCI minor elective</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 15

### Third Year

#### Fall

| Creative arts elective (p. 24) | 3 |
| SOCI minor elective | 2 | 3 |
| Elective | 1 | 3 |
| Elective | 1 | 3 |
| EHRD 371 | Applied Learning Principles | 3 |

**Semester Credit Hours** 15

#### Spring

| KINE 214/HLTH 214 | Health and Physical Activity for Children | 3 |
| SOCI minor elective | 2 | 3 |
| Elective | 1 | 3 |
| Elective | 1 | 3 |
| EHRD 372 | Learning and Development in HRD | 3 |

**Semester Credit Hours** 15

### Fourth Year

#### Fall

| EPSY 320 | Child Development | 3 |
| SOCI minor elective | 2 | 3 |
| Elective | 1 | 3 |
| Elective | 1 | 3 |
| EHRD 374 | Organizational Development | 3 |

**Semester Credit Hours** 15

#### Spring

| EPSY 321 | Adolescent Development | 3 |
| INST 301 | Educational Psychology | 3 |
| Elective | 1 | 3 |

**Semester Credit Hours** 15

### University Studies - BS, Dance Concentration

The dance concentration curriculum leads to a Bachelor of Science in University Studies. It is designed to serve students who are in good academic standing with the University (2.0+ GPR) and are specifically seeking an interdisciplinary degree plan which provides preparation in dance history and production. Students complete courses in the foundations of dance, dance production, and dance composition, and technique courses in various forms of dance. Students choose their minors. This concentration is housed in the Division of Kinesiology within the Department of Health and Kinesiology.

### Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

#### First Year

#### Fall

| ENGL 103 or ENGL 104 | Introduction to Rhetoric and Composition or Composition and Rhetoric | 3 |

American History Elective (p. 25) | 1 | 3 |
Life and Physical Science Elective (p. 22) | 1 | 4 |
Social and Behavioral Science Elective (p. 25) | 1 | 3 |
KINE/DCED Elective | 2 | 2 |

**Semester Credit Hours** 15

#### Spring

Life and Physical Sciences Elective (p. 22) | 1 | 4 |
American History Elective (p. 25) | 1.2 | 3 |
Mathematics (p. 22) | 3 |
KINE/DCED Elective | 2 | 2 |
University Studies - BS, Sports Conditioning Concentration

The sports conditioning concentration curriculum leads to a Bachelor of Science degree in University Studies. It is designed to serve students who are in good academic standing with the University (2.0+ GPR) and are specifically seeking an interdisciplinary degree plan which provides preparation for further study in fields or careers in coaching high performance athletes and personal training. The focus is on adult performance at collegiate, professional or fitness industry levels. Students will receive a coaching minor and will choose a second minor of their choice. This concentration is housed in the Division of Kinesiology within the Department of Health and Kinesiology.

Program Requirements

This degree plan has been laid out showing students the number of hours they must take each semester in order to complete the degree in four years without attending summer school. This is a suggested plan and does not have to be followed as laid out below. Students should use this information in conjunction with advising documents available from their advisor or the department website when scheduling courses each semester to ensure they are meeting all prerequisites, taking courses for admission to professional phase in a timely manner and meeting all grade requirements.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 103</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 104</td>
<td></td>
</tr>
<tr>
<td>or Introduction to Rhetoric and Composition I or Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>4</td>
</tr>
<tr>
<td>American History Elective (p. 25)</td>
<td>1</td>
</tr>
<tr>
<td>Social and Behavioral Sciences Elective (p. 25)</td>
<td>1</td>
</tr>
<tr>
<td>Creative Arts Elective (p. 24)</td>
<td>1</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>16</td>
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Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Elective (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>3</td>
</tr>
<tr>
<td>American National Government</td>
<td></td>
</tr>
<tr>
<td>DCED 202</td>
<td>3</td>
</tr>
<tr>
<td>Dance Appreciation</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 207</td>
<td>3</td>
</tr>
<tr>
<td>State and Local Government</td>
<td></td>
</tr>
<tr>
<td>KINE 120</td>
<td>1</td>
</tr>
<tr>
<td>The Science of Basic Health and Fitness</td>
<td></td>
</tr>
<tr>
<td>DCED 203</td>
<td>3</td>
</tr>
<tr>
<td>Dance Production</td>
<td>3</td>
</tr>
<tr>
<td>Language, Philosophy and Culture Elective (p. 23)</td>
<td>1,2</td>
</tr>
<tr>
<td>KINE/DCED Elective</td>
<td>2</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>14</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINE 175</td>
<td>1</td>
</tr>
<tr>
<td>Gender Neutral Partnering</td>
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</tr>
<tr>
<td>KINE/DCED Elective</td>
<td>2</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCED 306</td>
<td>2</td>
</tr>
<tr>
<td>Dance Composition I</td>
<td>2</td>
</tr>
<tr>
<td>KINE/DCED Elective</td>
<td>2</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>14</td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCED 400</td>
<td>2</td>
</tr>
<tr>
<td>Dance Composition II</td>
<td>2</td>
</tr>
<tr>
<td>KINE 199</td>
<td>1</td>
</tr>
<tr>
<td>Required Physical Activity</td>
<td>5</td>
</tr>
<tr>
<td>KINE/DCED Elective</td>
<td>2</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCED 401</td>
<td>3</td>
</tr>
<tr>
<td>Dance Pedagogy</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>14</td>
</tr>
</tbody>
</table>

Elective 1. Must meet Core Curriculum requirements.  
2. Select electives in consultation with advisor.  
3. Some electives should be selected to meet the International and Cultural Diversity graduation requirement.  
5. Must be a specific activity. See advisor for required activity.
### Second Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Elective</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206 American National Government</td>
<td>3</td>
</tr>
<tr>
<td>KINE 121 Physical and Motor Fitness Assessment</td>
<td>2</td>
</tr>
<tr>
<td>KINE 199 Required Physical Activity</td>
<td>1</td>
</tr>
<tr>
<td>KINE 213 Foundations of Kinesiology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 207 State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 202 Fundamentals of Human Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>Language, Philosophy and Culture Elective (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td>Coaching Elective</td>
<td>2</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
</tbody>
</table>

**Semester Credit Hours**

|                                      | 15      |

### Third Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>KINE 306 Functional Anatomy for Coaches</td>
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</tr>
<tr>
<td>KINE 305 Sport Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>Coaching Elective</td>
<td>2</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINE 302 Applied Exercise Physiology for Coaches</td>
<td>1</td>
</tr>
<tr>
<td>KINE 307 Lifespan Motor Development</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>KINE 324 Career Development in Coaching and Youth Development</td>
<td></td>
</tr>
<tr>
<td>KINE 431 Ropes Course and Group Process</td>
<td></td>
</tr>
<tr>
<td>KINE 485 Directed Studies</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Coaching Elective</td>
<td>2</td>
</tr>
</tbody>
</table>

**Semester Credit Hours**

|                                      | 15      |

### Fourth Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINE 318 Athletic Injuries</td>
<td>3</td>
</tr>
<tr>
<td>KINE 386 Sport Physiology</td>
<td>3</td>
</tr>
<tr>
<td>KINE 482 Seminar</td>
<td>1</td>
</tr>
<tr>
<td>SPMT 421 Legal Aspects of Sport</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINE 404 Coaching Psychology</td>
<td>3</td>
</tr>
<tr>
<td>KINE 483 Practicum in Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td>Minor</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours**

|                                      | 120     |

---

1. Must meet Core Curriculum requirements.
2. Some electives should meet the International and Cultural Diversity graduation requirement.
4. Must be a specific activity class. See advisor for appropriate course.
5. Select electives in consultation with advisor.
To achieve this mission the College of Engineering is committed to:

- ensuring an academic environment conducive to our faculties achieving the highest levels of academic and research excellence;
- building upon our traditional partnerships with industry, engineering practitioners and former students, to enhance our impact on the profession of engineering;
- encouraging excellence, innovation and cross-disciplinary initiatives in education and research;
- providing national and international leadership in undergraduate and graduate engineering education;
- becoming the engineering college of choice for the increasingly diverse citizenry of the state; and
- encouraging and supporting opportunities for our students to grow beyond their chosen disciplines by participation in ethics courses, leadership programs, study-abroad programs and research.

A student engineer can pursue any one of several degree plans, according to personal ambitions, interests and abilities. The student may choose the traditional BS degree and consider advanced research-oriented graduate programs leading to the MS and PhD degrees. Alternatively, the student may select the Doctor of Engineering program which is directed toward professional engineering.

Within the College of Engineering, the undergraduate programs in aerospace, biological and agricultural, biomedical, chemical, civil, computer, electrical, industrial, mechanical, nuclear, ocean, and petroleum engineering are accredited by the Engineering Accreditation Commission of ABET, www.abet.org. The electronic systems engineering technology program, and manufacturing and mechanical engineering technology program are accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org. The Computer Science program is accredited by the Computing Accreditation Commission of ABET, www.abet.org.

**Entrance and Enrollment Requirements**

The minimum requirements for entrance to the University are listed in the earlier pages of this catalog. Because of the importance of science and mathematics to engineering, high school students who aspire to a career in engineering are encouraged to take as many of these courses as possible. In particular, high school preparation should include four years of mathematics and four years of science emphasizing algebra, geometry, trigonometry, calculus, chemistry, physics and biology.

A critical step in an engineering education is proper individual placement in the first courses undertaken. The College of Engineering strongly recommends the following guidelines to students participating in the math advanced placement examinations in high school. Incoming engineering students can earn advanced placement (AP) credits for MATH 151 with a score of 4 on the Calculus AB exam or 3 on the BC exam, and for MATH 151 and MATH 152 by a score of 4 on the BC exam. While the student can accept these AP credits and enroll in the next course in the engineering mathematics sequence, the college recommends a more conservative decision about accepting advanced placement credits in math. Students who earn a 4 or 5 on the Calculus AB exam or a 3 or 4 on the BC exam are recommended to begin in MATH 151. Students who score a 5 on the Calculus BC exam are recommended to begin in MATH 151 or MATH 152. These conservative recommendations help ensure students have thoroughly mastered the content that is fundamental to the engineering curriculum. Students should discuss their choice with their assigned undergraduate academic advisor before registering for mathematics classes. New Student Conferences and associated Credit by Examination tests provide
information to advisors so that students begin at a level which may differ from the printed curriculum, but is appropriate to their aptitudes and background. All freshmen admitted into engineering are required to complete the Math Placement Exam (MPE) before the New Student Conferences and should review algebra, trigonometry and geometry prior to taking the MPE.

Because of the importance of computing in the disciplines housed within the College of Engineering, all entering students are required to possess a portable, network-ready personal computer capable of running software appropriate to their academic program, effective Fall 2014. Details about the personal computer needed to meet the requirement can be found on our website. No student will be denied admission to Texas A&M University based on an inability to purchase a computer.

Freshmen in General Engineering (https://engineering.tamu.edu/academics/advisors-procedures/entry-to-a-major/general-engineering-program), Engineering at Galveston (https://engineering.tamu.edu/academics/engineering-at-galveston), Engineering at McAllen (http://engineering.tamu.edu/academics/engineering-at-mcallen), or Engineering Academy programs (https://engineering.tamu.edu/academies) have a common first year engineering curriculum to allow time for students to learn about the 18 engineering degree granting majors. It is recognized that in most cases students are not made aware of all of our engineering majors while in high school. Students are introduced to the different engineering majors in the first year engineering courses, ENGR 111 and ENGR 112. Students are encouraged to leverage additional resources, including the career center, faculty, as well as advisors to get career advice. Students must complete the following courses in at least two semesters before applying to an engineering major: two engineering courses, two math courses, and two science courses in the freshman year engineering curriculum. Exceptions will be made as needed for students entering with credit for the required courses. The entry-to-a-major process is designed for students to take ownership of their future to identify at least three majors that are a good match for their career goals and academic performance. The entry-to-a-major process (https://engineering.tamu.edu/academics/advisors-procedures/entry-to-a-major/general-engineering-program) is designed to place students in the highest rank major possible based upon capacity and student performance. Students are encouraged to be in a major as early as possible. Students in the General Engineering (https://engineering.tamu.edu/academics/advisors-procedures/entry-to-a-major/general-engineering-program), Engineering at Galveston (https://engineering.tamu.edu/academics/engineering-at-galveston), Engineering at McAllen (http://engineering.tamu.edu/academics/engineering-at-mcallen), and Engineering Academy programs (https://engineering.tamu.edu/academies) must be in a major by the end of the third semester in engineering. Students in the Engineering Academy program must be in a major by the end of the fourth semester in engineering. Transfer students are admitted directly to a major degree granting program through the admissions process.

Freshman Curriculum

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

Bring Your Own Device (BYOD) (https://engineering.tamu.edu/easa/areas/academics/byod)

Just as students are required to have specific textbooks and supplies in order to gain the highest quality engineering educational experience, the College of Engineering requires students to purchase a computer to complement the course instruction. The vast majority of the students entering the College already bring some form of desktop or laptop computer with them when they begin school. Unfortunately, the variation in the types of computers makes it next to impossible for instructors to routinely ask students to use their own computers in the classroom. A computer designated by the College and purchased by entering students will provide students the convenience to explore course content anytime, anywhere.

While there are many computers available, the College can only guarantee performance and provide support for the specific computers identified by the College of Engineering. These computers will accommodate most of the needs of an engineering student throughout a four-year degree plan, balancing performance, cost and expected life of the computer. The computers have been negotiated with the various vendors, which are external to Texas A&M University, at a price point that is lower than what an individual would likely be able to negotiate. The price for each computer includes up to a four-year warranty.

ENGR [x]

ENGR[x] is a college-wide, zero-credit-hour required program that is composed of approved engineering-centric activities that meet the criteria of high-impact learning experiences. Undergraduate students can use their participation in one of these activities to partially satisfy their ENGR[x] requirement. Full satisfaction of the ENGR[x] requirement includes participating in an engineering-centric activity and submitting a meaningful, self-reflection that discusses the impact and overall experience on the student’s education.

Each department in the College of Engineering identifies the activities it will accept in satisfying a student’s ENGR[x] requirement. Some activities may include the following:

• Study Abroad (http://studyabroad.tamu.edu/)
• Internship or Co-op Experience (http://careercenter.tamu.edu/current-students)
• Grand Challenge Scholars Program (http://engineering.tamu.edu/programs/gcsp)
• The University, College, or Departmental Honors Program (http://honorsprograms.tamu.edu/)
• AggiE_Challenge (https://engineering.tamu.edu/easa/areas/enrichment/aggie-challenge)
• Startup Aggieland (http://startupaggieland.com/)
• Undergraduate research (https://engineering.tamu.edu/graduate/undergraduate-bridges)
• TAMU Minor or Certificate Programs, like the Zachry Leadership Program (https://engineering.tamu.edu/academics/certificates/zachry-leadership-program) or Engineering Honors Program (https://engineering.tamu.edu/programs/eh).
• Engineers without Borders Project (http://www.ewbtamu.org/projects/)
• Department design competitions, like the High Altitude Balloon Club (http://astrocenter.tamu.edu/stem-outreach/high-altitude-balloon-club/)
• Leadership in student organizations

Financial Aid

For financial aid recipients, purchase of the a computer device can be considered in the cost of attendance. To request this, please complete the Request to Change Cost of Attendance form (http://financialaid.tamu.edu/Forms-(1).aspx) for Scholarships & Financial Aid. Submission of documentation does not guarantee additional aid will be awarded. In certain situations students may not be eligible for additional funding.

Undergraduate students entering the College are required to follow the BYOD policy of purchasing one of the configured devices designated by the College. No student will be denied admission to Texas A&M University based on an inability to purchase a computer.

For more information, including specific requirements, visit the Bring Your Own Device (BYOD) web page (http://engineering.tamu.edu/easa/areas/academics/byod).

College Prerequisite Policy

The following prerequisite policy applies to any student in a College of Engineering undergraduate degree program and to any student who seeks admission to an undergraduate degree program in the College of Engineering. This policy is in addition to prerequisite policies imposed by the University (Texas A&M University Student Rules). For complete details concerning this policy, students should contact their Undergraduate Advising Office.

Students must earn a grade of C or better in all courses identified in each College of Engineering undergraduate degree program and any prerequisites for these courses. If a student earns a grade of D or F in any of these courses, the student is required to repeat the course before enrolling in a more advanced course that has the D/F course as a prerequisite. A student may attempt a course no more than three times, including courses graded Q or W but excluding those graded NG, unless approval has been received from their department. A student must complete all prerequisites for a course with a grade of C or better by the start of the semester in which the student plans to enroll in the course.

A student is responsible for checking the prerequisites for each course to ensure the prerequisite requirements have been satisfied. A student who registers for a course for which he/she lacks the necessary prerequisite course(s) and/or the prerequisite grade requirement will be required to drop the course. A student who is told to drop a course and is still enrolled by the deadline set each semester may be administratively dropped by their department. If a student is administratively dropped from a course, the student is responsible for all financial obligations associated with the drop. An administrative drop may adversely impact (including, but not limited to): health insurance benefits, financial aid, athletic eligibility, INS status, veterans’ benefits, and eligibility to participate in extracurricular activities.

Fast Track Program (https://engineering.tamu.edu/academics/fasttrack)

Each participating department in the College of Engineering has streamlined its program for Fast Track participants by substituting specific graduate courses for selected undergraduate offerings. Academically qualified students take these 600-level courses during their senior year, earning graduate credit while fulfilling undergraduate requirements through “credit by exam.” The individual department sets its own grade and exam requirements for earning dual credit. The department also establishes the maximum number of credit hours allowed for acceleration, usually five to seven.

Industry-University Cooperative Education

Cooperative education is a study-work plan of education in which a student alternates periods of attendance in college or university with periods of employment in industry related to his or her major. Students who choose this degree plan must complete at least 12 months of experience in order to receive the cooperative education certificate. The practice of engineering is an art which is learned through practice as well as in the classroom. The cooperative education program provides the education that can be achieved from practice by having the student work with professional engineers on the job. Consequently, the student who graduates with the cooperative education certificate has both the academic background and the practical experience to qualify him or her for more meaningful employment in the profession of engineering. The cooperative education work periods also provide an income for students that allows them to pay for their school expenses.

Those who wish additional information concerning this program should contact the Associate Director of Cooperative Education.

Advanced Study

Students who rank in the upper half of their undergraduate class should give serious consideration to developing their full intellectual potential in engineering by continuing with advanced studies at the graduate level. Two routes are available for students. The traditional master of science and doctor of philosophy degrees should be considered by students who wish to go into research fields. For those students interested in the practice of professional engineering, the master of engineering and doctor of engineering degrees should be given serious consideration. The professional doctor of engineering degree was established in the fall of 1974 to fill a need for better-educated engineers in the practice of engineering. Students may enter this program at any time after they receive the bachelor’s degree in engineering by applying and being accepted to a departmental graduate program within the College of Engineering. Master’s level degrees require a minimum of one year of course work after the bachelor’s, and the doctoral degrees require a minimum of an additional two years of coursework. The doctor of philosophy also requires a dissertation based on research by the student, and the doctor of engineering requires at least one year of internship experience in industry or government.
For more information concerning these programs, please refer to the Texas A&M University Graduate and Professional Catalog or contact the Office of the Dean of Engineering.

The engineering programs also provide a foundation for further education in the fields of medicine, law or business. An engineering background will prepare the individual to understand, contribute to and embrace technical advances in these fields.

The Texas A&M Engineering Academies

The Texas A&M Engineering Academies are co-enrollment programs between the College of Engineering and selected two-year institutions. Students in the Engineering Academy program are engineering students, who take their math, science, and core courses at the two-year institutions and the engineering courses from the College of Engineering. The admission process for the Engineering Academies is unique to each partner institution, with the offer of admission to the Engineering Academy made by Texas A&M University. Texas A&M Engineering Academy students, who satisfy the program GPA requirements, apply for entry to a major as early as the end of the first year.

Eligible students receive financial aid based upon their combined credit hours from both institutions.

For more information, including specific requirements for each of the partner institutions, visit Texas A&M Engineering Academies Texas A&M Engineering Academies (https://engineering.tamu.edu/academies).

Majors

College of Engineering

- Bachelor of Science in Biological and Agricultural Engineering (p. 344)
- Bachelor of Science in Interdisciplinary Engineering (p. 346)

Department of Aerospace Engineering

- Bachelor of Science in Aerospace Engineering (p. 353)

Department of Biomedical Engineering

- Bachelor of Science in Biomedical Engineering (p. 356)

Artie McFerrin Department of Chemical Engineering

- Bachelor of Science in Chemical Engineering (p. 362)

Zachry Department of Civil Engineering

- Bachelor of Science in Civil Engineering (p. 366)
- Bachelor of Science in Civil Engineering, Coastal and Ocean Engineering Track (p. 367)
- Bachelor of Science in Civil Engineering, Construction Engineering and Management Track (p. 369)
- Bachelor of Science in Civil Engineering, Environmental Engineering Track (p. 371)
- Bachelor of Science in Civil Engineering, General Civil Engineering Track (p. 373)
- Bachelor of Science in Civil Engineering, Geotechnical Engineering Track (p. 376)
- Bachelor of Science in Civil Engineering, Structural Engineering Track (p. 377)
- Bachelor of Science in Civil Engineering, Transportation Engineering Track (p. 379)
- Bachelor of Science in Civil Engineering, Water Resources Engineering Track (p. 381)

Department of Computer Science and Engineering

- Bachelor of Science in Computer Engineering, Computer Science Track (p. 384)
- Bachelor of Science in Computer Science (p. 386)

Department of Electrical and Computer Engineering

- Bachelor of Science in Computer Engineering, Electrical Engineering Track (p. 388)
- Bachelor of Science in Electrical Engineering (p. 390)

Department of Engineering Technology and Industrial Distribution

- Bachelor of Science in Electronic Systems Engineering Technology (p. 393)
- Bachelor of Science in Industrial Distribution (p. 394)
- Bachelor of Science in Manufacturing and Mechanical Engineering Technology (p. 396)
- Bachelor of Science in Multidisciplinary Engineering Technology (p. 398)

Department of Industrial and Systems Engineering

- Bachelor of Science in Industrial Engineering (p. 401)

Department of Mechanical Engineering

- Bachelor of Science in Mechanical Engineering (p. 408)

Department of Nuclear Engineering

- Bachelor of Science in Nuclear Engineering (p. 413)

Department of Ocean Engineering

- Bachelor of Science in Ocean Engineering (p. 416)

Harold Vance Department of Petroleum Engineering

- Bachelor of Science in Petroleum Engineering (p. 419)

Minors

College of Engineering

- Cybersecurity Minor (p. 346)
- Engineering Project Management Minor (p. 347)
Certificates

The College of Engineering has designed the following certificate programs to offer ambitious students the opportunity to go beyond the traditional curriculum and gain specific knowledge in a concentration area. Students are required to consult with their academic advisor prior to submitting an application for a certificate. Enrolling and being accepted into a certificate program does not guarantee registration into required courses. Each certificate, with the exception of the Business Management Certificate, will be recognized on the candidate’s transcript. A coordinator reviews each student’s coursework via a certificate worksheet and requirements met prior to certification. Certificate coordinators are given the discretion to determine the eligibility of students in other colleges and/or majors to pursue College of Engineering certificates. For specific information on each certificate available, visit the College of Engineering website.

College of Engineering

- Business Management Certificate for Engineering Students
- Engineering Honors Certificate
- Engineering Leadership Certificate
- International Engineering Certificate
- Polymer Specialty Certificate
- Safety Engineering Certificate

Department of Biomedical Engineering

- Engineering Therapeutics Manufacturing Certificate
- Quality Engineering for Regulated Medical Technologies Certificate

Department of Industrial and Systems Engineering

- Data Center Operations Engineering Certificate
- Engineering Systems Management Certificate

Harold Vance Department of Petroleum Engineering

- Energy Engineering Certificate

Masters

College of Engineering

- Master of Engineering in Engineering
- Master of Engineering in Systems Engineering
- Master of Science in Interdisciplinary Engineering
- Master of Science in Safety Engineering

Department of Aerospace Engineering

- Master of Engineering in Aerospace Engineering
• Master of Science in Aerospace Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/aerospace/ms)

Department of Biomedical Engineering
• Master of Engineering in Biomedical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/biomedical/meng)
• Master of Science in Biomedical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/biomedical/ms)

Artie McFerrin Department of Chemical Engineering
• Master of Engineering in Chemical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/chemical/meng)
• Master of Science in Chemical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/chemical/ms)

Zachry Department of Civil Engineering
• Master of Engineering in Civil Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/civil/meng)
• Master of Science in Civil Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/civil/ms)

Department of Computer Science and Engineering
• Master of Computer Science in Computer Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/computer-science/mcs)
• Master of Engineering in Computer Engineering, Computer Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/computer-science/engineering-meng)
• Master of Science in Computer Engineering, Computer Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/computer-science/engineering-ms)
• Master of Science in Computer Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/computer-science/ms)

Department of Electrical and Computer Engineering
• Master of Engineering in Computer Engineering, Electrical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/electrical-computer/engineering-meng)
• Master of Science in Electrical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/electrical-computer/electrical-ms)

Department of Engineering Technology and Industrial Distribution
• Master of Industrial Distribution in Industrial Distribution (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/technology-industrial-distribution/mid)

Department of Industrial and Systems Engineering
• Master of Engineering in Industrial Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/industrial-systems/meng)
• Master of Science in Engineering Systems Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/industrial-systems/engineering-systems-management-ms)
• Master of Science in Industrial Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/industrial-systems/ms)

Department of Materials Science and Engineering
• Master of Engineering in Materials Science and Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/materials-science/meng)
• Master of Science in Materials Science and Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/materials-science/ms)

Department of Mechanical Engineering
• Master of Engineering in Mechanical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/mechanical/meng)
• Master of Science in Mechanical Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/mechanical/ms)

Department of Nuclear Engineering
• Master of Engineering in Nuclear Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/nuclear/meng)
• Master of Science in Nuclear Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/nuclear/ms)

Department of Ocean Engineering
• Master of Engineering in Ocean Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/ocean/ocean-meng)
• Master of Science in Ocean Engineering (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/ocean/ocean-ms)
Biological and Agricultural Engineering - BS

Graduates from the Biological and Agricultural Engineering program will:

- Successfully enter the biological and agricultural engineering profession as practicing engineers and consultants in the natural resources, machine systems, food processing, bioprocessing, and agricultural production and processing fields.
- Pursue graduate education and research at major universities in biological and agricultural engineering, and related fields.
- Advance into leadership positions in their chosen fields and professional societies.
- Engage in life-long learning through professional registration and professional development.

Students learn to apply fundamental knowledge of biological and physical sciences, mathematics, and engineering principles to formulate and solve engineering problems. Engineering design is integrated throughout the curriculum, along with opportunities to develop...
communication, learning, and teamwork skills, culminating in a capstone design experience. Electives in the curriculum allow the student to focus in one of the following areas:

- **Environmental and Natural Resources Engineering**—design and management of systems affecting soil, water, and air resources.
- **Renewable Energy Engineering**—design and development of biomass, wind and solar energy systems.
- **Food and Bioprocess Engineering**—design and development of systems for processing and handling of food and agricultural products and processes involving cells, enzymes, or other biological components.
- **Machine Systems Engineering**—design and development of machines and machine systems for food, feed and fiber production and processing.

Students select courses with the assistance of faculty advisors in an individualized advising system. Faculty members also assist with professional development and job placement for students.

The biological and agricultural engineering program is jointly administered by the College of Agriculture and Life Sciences and the College of Engineering, and the curriculum is fully accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org. The department is one of the largest in North America and is consistently ranked as one of the top programs in the nation.

For graduates to become successful practicing biological and agricultural engineers, students need to acquire a set of skills, knowledge, and behaviors as they progress through the curriculum. We have established the following program outcomes outlining what students are expected to know and be able to do upon completion of the curriculum. At the time of graduation, students should have:

1. an ability to apply knowledge of mathematics, science and engineering;
2. an ability to design and conduct experiments, as well as to analyze and interpret data;
3. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
4. an ability to function on multidisciplinary teams;
5. an ability to identify, formulate, and solve engineering problems;
6. an understanding of professional and ethical responsibility;
7. an ability to communicate effectively;
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
9. a recognition of the need for, and an ability to engage in life-long learning;
10. a knowledge of contemporary issues;
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
<td>2</td>
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<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td></td>
<td>PHYS 218</td>
<td>Mechanics</td>
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Semester Credit Hours: 14

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<tr>
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<td>BIOL 113</td>
<td>Essentials in Biology</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td></td>
<td>ENGR 112</td>
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<td>MATH 152</td>
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<td>PHYS 208</td>
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Semester Credit Hours: 17

#### Second Year

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<tbody>
<tr>
<td>Fall</td>
<td>CHEM 222</td>
<td>Elements of Organic and Biological Chemistry</td>
<td>3</td>
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<td></td>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
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<tr>
<td></td>
<td>MEEN 221</td>
<td>Statics and Particle Dynamics</td>
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<td>MEEN 222/ MSEN 222</td>
<td>Materials Science</td>
<td>3</td>
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<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<td>MATH 308</td>
<td>Differential Equations</td>
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Semester Credit Hours: 15

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<td>BAEN 201</td>
<td>Analysis of Biological and Agricultural Engineering Problems</td>
<td>3</td>
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<td></td>
<td>BAEN 301</td>
<td>Biological and Agricultural Engineering Fundamentals I</td>
<td>3</td>
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<td></td>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
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<td></td>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
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<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<td>Differential Equations</td>
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Semester Credit Hours: 18

#### Third Year

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<tr>
<td>Fall</td>
<td>BAEN 302</td>
<td>Biological and Agricultural Engineering Fundamentals II</td>
<td>3</td>
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<td></td>
<td>BAEN 340</td>
<td>Fluid Mechanics</td>
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<td>BAEN 354</td>
<td>Engineering Properties of Biological Materials</td>
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<td></td>
<td>BAEN 375</td>
<td>Design Fundamentals for Agricultural Machines and Structures</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
<td>3</td>
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</table>

Semester Credit Hours: 15
Interdisciplinary Engineering - BS

The College of Engineering offers a BS in Interdisciplinary Engineering.

Cybersecurity - Minor

The Cybersecurity Minor is designed to appeal to both less technically-oriented and more technically-oriented undergraduate students, across multiple departments, in multiple colleges. All students who enroll in the minor will acquire a basic understanding of programming, and a firmly grounded understanding of cybersecurity, to include cyber ethics. The
inclusion of these courses in the minor will allow students to specialize in
the area of cybersecurity that is most closely aligned with their respective
interests and their degree plans.

**Program Requirements**

Select one of the following tracks:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td></td>
<td><strong>Engineering Track</strong></td>
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<tr>
<td></td>
<td>CSCE 313 Introduction to Computer Systems</td>
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<tr>
<td></td>
<td>CSCE 315 Programming Studio</td>
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<tr>
<td></td>
<td>CSCE 410 Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CSCE 465 Computer and Network Security</td>
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<tr>
<td></td>
<td>CSCE 451 Software Reverse Engineering</td>
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<tr>
<td></td>
<td>CSCE 463 Networks and Distributed Processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ECEN 424 Fundamentals of Networking</td>
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<tr>
<td></td>
<td><strong>Interdisciplinary Track</strong></td>
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<tr>
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<td>CSCE 110 Programming I</td>
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<td>CSCE 111 Introduction to Computer Science Concepts and Programming</td>
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<td>CSCE 121 Introduction to Program Design and Concepts</td>
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<td>CSCE 206 Structured Programming in C</td>
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<td>CSCE 221 Data Structures and Algorithms</td>
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<td>ESET 269 Embedded Systems Development in C</td>
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<td>TCMG 308 Cybersecurity and Digital Ethics</td>
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<td>BMEN 428 Microcontrollers and Communications in Medical Devices</td>
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<td>CSCE 410 Operating Systems</td>
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<td>CSCE 431 Software Engineering</td>
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<td>CSCE 434 Compiler Design</td>
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<td>CSCE 436 Computer-Human Interaction</td>
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<td>CSCE 451 Software Reverse Engineering</td>
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<td>CSCE 463 Networks and Distributed Processing</td>
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<td>CSCE 465 Computer and Network Security</td>
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<td>ECEN 424 Fundamentals of Networking</td>
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<tr>
<td></td>
<td>TCMG 303 Unix System Administration Practices</td>
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<td>TCMG 306 Database Systems Administration and Application</td>
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<td>TCMG 476 Technical Network Capstone</td>
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<td><strong>Technology track</strong></td>
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<td>ESET 269 Embedded Systems Development in C</td>
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<td></td>
<td>ESET 315 Local-and-Metropolitan-Area Networks</td>
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<td>ESET 415 Advanced Network Systems and Security or TCMG 47 or Technical Network Capstone</td>
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<td>TCMG 308 Cybersecurity and Digital Ethics</td>
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<td>BMEN 428 Microcontrollers and Communications in Medical Devices</td>
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<td>ECEN 424 Fundamentals of Networking</td>
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<tr>
<td></td>
<td>TCMG 303 Unix System Administration Practices</td>
<td>3</td>
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<tr>
<td></td>
<td>TCMG 412 Contemporary Issues in Technology Management</td>
<td>3</td>
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</table>

Total Semester Credit Hours: 16

Minimum required GPA to declare minor is a 2.5.

Must make a grade of 'C' or better in each course used towards minor.

Must achieve an overall GPA of 2.5 in approved minor coursework.

Minimum of 6 hours at 300-400 level.

**Engineering Project Management - Minor**

The Engineering Project Management minor is intended to help meet the requirements of industry by educating undergraduate engineering students to understand complex engineering projects, project organizations, and project management methods. Students completing this minor will be able to work effectively in multidisciplinary engineering projects immediately after completion and to advance more
rapidly within the project management organization and profession. The management of projects entails technical knowledge, engineering skills, and management skills.

To earn the minor, a student must complete a total of 16 semester credit hours that include prerequisite introductory core courses (ENGR 333 and ENGR 380) and courses selected from the following 4 categories:

1. **Business management and leadership.** The courses listed under this category provide required skills to understand the key management principles and provide leadership in project planning and execution.
2. **Project economics, analysis, and decisions.** The courses listed under this category provide advanced understanding of the analytical tools required to support project planning and execution.
3. **Application of project management tools.** The courses listed under this category provide examples of the application of project management principles.
4. **Project experience as directed studies.** The courses listed under this category provide practical experience in managing projects via internships, campus or community-based engagements, or research. Students should be able to receive credit via ENGR 485 for documenting their project experience.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGR 333</td>
<td>Project Management for Engineers</td>
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<tr>
<td>ENGR 380</td>
<td>Seminar Series in Engineering Project Management</td>
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</table>

**Business Management and Leadership**

Select from the following: 2-4

- MGMT 309 Survey of Management
- SOMS 380 Workshop in Leadership Education
- SOMS 381 Workshop in Leadership Education II
- SOMS 481 Seminar in Executive Leadership
- SOMS 482 Seminar in Executive Leadership II
- ESET 319 Engineering Leadership
- ENGR 289 Special Topics in... (Introduction to Engineering Leadership)
- ENGR 489 Special Topics in... (Leadership and Business Fundamentals)
- ENGR 489 Special Topics in... (Role of Engineering and Business in Society)
- ENGR 489 Special Topics in... (Exploring Your Leadership Qualities and Perspective)
- ENGR 489 Special Topics in... (Leadership Capstone)

**Project Economics, Analysis and Decisions**

Select from the following: 2-6

- ISEN 302 Economic Analysis of Engineering Projects
- or ISEN 308r Engineering Economic Analysis
- CVEN 322 Civil Engineering Systems
- PETE 353 Petroleum Project Evaluation
- CHEN 430/ SENG 430 Risk Analysis in Safety Engineering

**Application of Project Management Tools**

Select from the following: 3-6

- ISEN 411 Engineering Management Techniques
- CVEN 405 Construction Management of Field Operations
- CVEN 473 Engineering Project Estimating and Planning
- CVEN 349 Civil Engineering Project Management
- ISEN 330 Human Systems Interaction
- CSCE 431 Software Engineering
- CSCE 315 Programming Studio
- SENG 312 System Safety Engineering
- CHEN 460/ SENG 460 Quantitative Risk Analysis in Safety Engineering
- ESET 329 Six Sigma and Applied Statistics
- ESET 419 Engineering Technology Capstone I
- BMEN 469 Entrepreneurial Issues in Biomedical Engineering
- MEEN 489 Special Topics in... (Entrepreneurship Related to Nanomaterials Application in Energy)

**Project Experience as Directed Studies**

Select from the following: 0-3

- ENGR 485 Directed Studies (Internship Project, Campus Project or Community Project)
- ENGR 491 Research (Research Project)

Total Semester Credit Hours 16

Minimum required GPA to declare minor is a 2.5.

Must earn a grade of ‘C’ or better in each course used towards minor.

Must achieve an overall GPA of 2.5 in approved minor coursework.

**Business Management - Certificate**

The Business Management Certificate offers instruction in business acumen which complements the technical skills engineers receive through their major coursework. Recognized by the College of Engineering, it is a highly intensive program intended to teach the vital business competencies students need before entering the workforce. The certificate is comprised of the Business Management Initiative, which is an intensive 120-hour course that is held for three weeks in the summer of each year. Students attend class from 8 am-5 pm daily and learn the principles of accounting, finance, management and marketing. The course meetings are held at the Mays Business School, and courses are taught by business faculty. Students completing this course will be awarded a Business Management Certificate from the Mays Business School.
Engineering Honors - Certificate

The Engineering Honors Certificate offers academically talented students the opportunity to pursue engineering studies of a depth and range that will fully challenge their abilities and meet their interests.

Engineering honors students have the opportunity to enroll in honors courses, obtain early involvement in graduate studies and participate in honors contracting and honors independent study. Students take part in special interdisciplinary seminars that focus on the practice of engineering in industry, research and development. These seminars promote student interaction with faculty, industry professionals and graduate student researchers.

The Engineering Honors Certificate is administered by the Engineering Academic and Student Affairs office in close collaboration with each engineering department.

Each departmental coordinator is responsible for setting policy as well as advising and mentoring the respective honors students.

For additional information, contact the Engineering Honors Certificate coordinator at engineeringhonors@tamu.edu or 979-845-7200.

Program Requirements

<table>
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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tr>
<td>ENGR 181</td>
<td>Engineering Honors Seminar I</td>
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<td>ENGR 281</td>
<td>Engineering Honors Mentoring &amp; Team Building Seminar</td>
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<tr>
<td>ENGR 381</td>
<td>Engineering Honors Leadership &amp; Project Management Seminar</td>
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</table>

Total Semester Credit Hours 11

International Engineering - Certificate

Advances in communications and transportation technologies coupled with a historical trend of nations moving towards market economies have made it possible for companies to function using the best locations and resources no matter where in the world. The resources available are of a wide variety including money, state-of-the-art technologies, know-how and scientific discoveries, raw materials, components, and human resources. An effective engineer in this global environment is one that complements his/her core technical knowledge with excellent cross-cultural competence and international exposure. The certificate program prepares graduates for positions in multinational companies and foreign organizations.

For additional information, contact the International Engineering Certificate coordinator or Engineering Academic and Student Affairs, Engineering Activities Building B, (979) 845-7200.

Program Requirements

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<tr>
<td>ENGR 250</td>
<td>Principles in Engineering Leadership</td>
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<td>ENGR 350</td>
<td>Engineering Leadership and Business Fundamentals</td>
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<td>ENGR 351</td>
<td>The Role of Engineering and Business in Society</td>
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<td>ENGR 450</td>
<td>Exploring Your Engineering Leadership Qualities and Perspective</td>
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<td>ENGR 451</td>
<td>Engineering Leadership Capstone</td>
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</table>

Total Semester Credit Hours 15

Internationalization Component 2

International and cultural diversity (p. 40) 6

Global Engineering Design Component 3

Select one of the following:

- ENGR 410 Global Engineering Design 3
- Select a Design course in an engineering department with a significant international component 3

Total Semester Credit Hours 15

1 Three credit hours of at least a 200-level course in a single language (excluding English). Students could place out of this course with AP credit or by showing proficiency by exam. These courses can be taken in outside the U.S. However, immersion language to gain this basic level of language learning will not count for the international experience.

2 To be selected from approved International and Cultural Diversity courses. At least one course must have significant focus on international diversity.

3 Individualized and approved by the College of Engineering. May be satisfied by an approved study abroad program, international internship, directed study or research experience, or another approved course or field experience. The minimum time period to be abroad is one summer term. Students are encouraged to go abroad in programs that are appropriate to their academic and career objectives.

Polymer Specialty - Certificate

The Polymer Specialty Certificate is designed to provide a strong interdisciplinary educational program for undergraduate engineering and suitably prepared science students interested in pursuing a polymer career. The certificate will also provide knowledge to reduce the training time required to turn Texas A&M students into productive members of
the industrial workforce. This program is the first of its kind offered in the State of Texas and is administered by the Polymer Technology Center. No schools in the State of Texas offer a formal polymer curriculum, despite the significant role the polymer industry plays in the state’s economy.

For additional information, contact the Polymer Specialty Certificate coordinator or Engineering Academic and Student Affairs, Engineering Activities Building B, (979) 845-7200.

## Program Requirements

<table>
<thead>
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<tbody>
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<td>AERO 406</td>
<td>Polymer Nanocomposites and their Applications</td>
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<td>AERO 606</td>
<td>Multifunctional Materials</td>
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<td>BMEN 482</td>
<td>Polymeric Biomaterials</td>
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<td>CHEN 451</td>
<td>Introduction to Polymer Engineering</td>
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<td>MEEN 455</td>
<td>Engineering with Plastics</td>
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<td>MEEN 458</td>
<td>Processing and Characterization of Polymers</td>
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<td>MEEN 607</td>
<td>Polymer Physical Properties</td>
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<td>MEEN 635</td>
<td>Flow and Fracture of Polymeric Solids</td>
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<td>CHEM 466</td>
<td>Polymer Chemistry</td>
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<td>MEEN 451</td>
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<td>MEEN 471</td>
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<td>BAEN 485</td>
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<td>Directed Studies ¹</td>
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<tr>
<td>MEEN 606/ MSEN 626</td>
<td>Polymer Laboratories ¹</td>
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<td>BMEN 683</td>
<td>Polymeric Biomaterial Synthesis</td>
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<tr>
<td>MEEN 657</td>
<td>Viscoelasticity of Solids and Structures ¹</td>
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<td>SENG 310</td>
<td>Industrial Hygiene Engineering</td>
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<td>System Safety Engineering</td>
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<td>Industrial Safety Engineering</td>
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<td>Risk Analysis in Safety Engineering</td>
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<td>Quantitative Risk Analysis in Safety Engineering</td>
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<td>SENG 485</td>
<td>Directed Studies ¹</td>
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<tbody>
<tr>
<td>SENG 309/ NUEN 309</td>
<td>Radiological Safety</td>
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<td>SENG 321</td>
<td>Industrial Safety Engineering</td>
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<td>SENG 422</td>
<td>Fire Protection Engineering - Facilities Design</td>
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<td>SENG 430/ CHEN 430</td>
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<td>SENG 455/ CHEN 455</td>
<td>Process Safety Engineering</td>
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<tr>
<td>SENG 485</td>
<td>Directed Studies ¹</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

---

### Department of Aerospace Engineering

Aerospace Engineering is a complex, rapidly changing field that includes aerodynamics, structures and materials, propulsion, dynamics and control, and astrodynamics. The primary application of Aerospace

---

1 Up to 3 hours of credit can be substituted with research emphasizing polymers (provided polymer coursework has been initiated). Research must be approved by the director of the Polymer Technology Center.

Students should take at least 2 courses outside their department to receive the Polymer Certificate.

### Safety Engineering - Certificate

The Safety Engineering Certificate prepares the graduate for positions in several areas of safety engineering. Students must complete 15 semester credit hours of specified courses to earn a Safety Engineering Certificate. The Safety Program coordinator reviews each student’s coursework prior to certification.

For additional information, contact the Safety Engineering Certificate coordinator or Engineering Academic and Student Affairs, Engineering Activities Building B, (979) 845-7200.

## Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENG 310</td>
<td>Industrial Hygiene Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SENG 312</td>
<td>System Safety Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SENG 430/ CHEN 430</td>
<td>Risk Analysis in Safety Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENG 309/ NUEN 309</td>
<td>Radiological Safety</td>
<td></td>
</tr>
<tr>
<td>SENG 312</td>
<td>System Safety Engineering</td>
<td></td>
</tr>
<tr>
<td>SENG 321</td>
<td>Industrial Safety Engineering</td>
<td></td>
</tr>
<tr>
<td>SENG 422</td>
<td>Fire Protection Engineering - Facilities Design</td>
<td></td>
</tr>
<tr>
<td>SENG 430/ CHEN 430</td>
<td>Risk Analysis in Safety Engineering</td>
<td></td>
</tr>
<tr>
<td>SENG 455/ CHEN 455</td>
<td>Process Safety Engineering</td>
<td></td>
</tr>
<tr>
<td>SENG 477</td>
<td>Air Pollution Engineering</td>
<td></td>
</tr>
<tr>
<td>SENG 460/ CHEN 460</td>
<td>Quantitative Risk Analysis in Safety Engineering</td>
<td></td>
</tr>
<tr>
<td>SENG 485</td>
<td>Directed Studies ¹</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

---

1 Up to 3 hours of credit can be substituted with research emphasizing polymers (provided polymer coursework has been initiated). Research must be approved by the director of the Polymer Technology Center.
Engineering is to design and develop flight vehicles, such as aircraft, missiles, spacecraft and satellites. Aerospace engineering is also important and applicable to other vehicles and systems, such as rotorcraft, submarines, automobiles, wind turbines, advanced robotics, re-entry vehicles, exotic materials and computational simulations.

The mission of the Aerospace Engineering program is

1. to provide students with a quality undergraduate and graduate education for the State of Texas and the nation through an innovative educational program;
2. to advance the science and aerospace engineering knowledge base through basic and applied research, inventions, technologies and solutions to aerospace problems; and
3. to serve the aerospace engineering profession by preparing leaders for leadership in the creation, design and operation of the next generation aerospace systems.

To achieve this mission, the educational objectives established by the Aerospace Engineering undergraduate program are to produce graduates whose expected accomplishments within three to five years of graduation are

1. to have successful careers in industry, private practice, or government, or have pursued advanced graduate studies;
2. to be skilled practitioners who apply their knowledge and skills to solve relevant engineering problems in the aerospace or a related profession; and
3. to function well in teams, communicate well, continue enhancing their professional competence, and understand the impact of engineering solutions.

To carry out these educational objectives, the goals of the program are

1. using a high quality faculty, to provide a comprehensive aerospace engineering education that develops in students the fundamental skills necessary for the design, synthesis, analysis and research development of aircraft, spacecraft and other high technology flight systems; and
2. to prepare students for the aerospace engineering profession and related fields by developing the attributes needed, so that they can contribute successfully to society and to the engineering profession now and in the future.

The Department offers a Bachelor of Science in Aerospace Engineering with Honors degree option. This option was proposed by our students and implemented for our students. Very few programs across the country offer this type of experience within Aerospace Engineering. You will be part of an honors community and be provided with the opportunity to enhance your learning experience through one-on-one research with a faculty mentor, introduction to advanced aerospace theories, and much more. The Department also offers a Fast Track program, which is tailored for high-achieving undergraduate students who wish to extend their knowledge and gain an edge by earning a Master of Engineering (MEng) degree. Fast Track allows qualified students to earn up to nine hours of credit toward their Aerospace Engineering undergraduate and graduate degrees. Consequently, through Fast Track a student can earn a MEng degree in two semesters beyond their undergraduate degree.

Laboratories supplement theoretical studies in the major disciplines in the Department. Numerous wind tunnels for low-speed and supersonic aerodynamic studies, a jet engine test facility, numerous research aircraft, a flight simulator, a satellite laboratory with Integrated Concurrent Engineering Capability, a robotics laboratory, and state-of-the-art materials and structures testing equipment are available, equipped with modern instrumentation. The Department and the University also provide an extensive array of computing resources.

Students are encouraged to enrich their undergraduate experience through a variety of ways in the Department, including co-op and internship positions, student competition design projects, and even undergraduate research. In addition, students have the opportunity to study abroad or participate in an international exchange program.

The Department also offers programs of study leading to the MEng, MS, and PhD degrees (see the Texas A&M University Graduate and Professional Catalog). The Bachelor of Science in Aerospace Engineering degree is accredited by the Engineering Accreditation Commission of ABET, www.abet.org. Before commencing course work in the major, students must be admitted to the major or have the approval of the Department.

**Faculty**

Alfriend, Kyle T, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1967

Benzerga, Amine A, Professor
Aerospace Engineering

Bhattacharya, Raktim, Associate Professor
Aerospace Engineering
PHD, University of Minnesota, Twin Cities, 2003

Bowersox, Rodney D, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1992

Boyd, James G, Associate Professor
Aerospace Engineering
PHD, Texas A&M University, 1994

Chakravorty, Suman, Associate Professor
Aerospace Engineering
PHD, University of Michigan, 2004

Chamitoff, Gregory E, Professor of the Practice
Aerospace Engineering
PHD, Massachusetts Institute of Technology, 1992

Cizmas, Paul G, Professor
Aerospace Engineering
PHD, Duke University, 1995

Donzis, Diego A, Associate Professor
Aerospace Engineering
PHD, Georgia Institute of Technology, 2007

Dunbar, Bonnie J, Professor
Aerospace Engineering
PHD, University of Houston, 1983

Elmendorf, Harry M, Associate Professor of the Practice
Aerospace Engineering
BS, Texas A&M University, 1970
Girimaji, Sharath, Professor
Aerospace Engineering
PHD, Cornell University, 1990

Hara, Kentaro, Assistant Professor
Aerospace Engineering
PHD, University of Michigan, 2015

Hartl, Darren J, Assistant Professor
Aerospace Engineering
PHD, Texas A&M University, 2009

Hurtado, John, Professor
Aerospace Engineering
PHD, Texas A&M University, 1995

Junkins, John L, Distinguished Professor
Aerospace Engineering
PHD, University of California, Los Angeles, 1969

Karpetis, Adonios N, Associate Professor
Aerospace Engineering
PHD, Yale University, 1998

Kinra, Vikram K, Professor
Aerospace Engineering
PHD, Brown University, 1975

Lagoudas, Dimitris, Professor
Aerospace Engineering
PHD, Lehigh University, 1986

Langari, Gholamreza, Professor
Aerospace Engineering
PHD, University of California, Berkeley, 1991

Le Graverend, Jean-Briac B, Assistant Professor
Aerospace Engineering
PHD, Ecole Nationale de Mécanique et d'Aérotechnique, France, 2013

Limbach, Christopher M, Research Assistant Professor
Aerospace Engineering
PHD, Princeton University, 2015

Lutz, Wayne A, Associate Professor of the Practice
Aerospace Engineering
MS, University of Southern California, 1984

Majji, Manoranjan, Assistant Professor
Aerospace Engineering
PHD, Texas A&M University, 2009

Miles, Richard, Professor
Aerospace Engineering
PHD, Stanford University, 1972

Moble, Benedict, Assistant Professor
Aerospace Engineering
PHD, University of Maryland, 2010

Mortari, Daniele, Professor
Aerospace Engineering
PHD, University La Sapienza of Rome, 1980

Naraghi, Mohammad, Assistant Professor
Aerospace Engineering
PHD, University of Illinois at Urbana-Champaign, 2009

Pollock, Thomas C, Associate Professor
Aerospace Engineering
PHD, University of Virginia, 1977

Poludnenko, Oleksiy Y, Associate Professor
Aerospace Engineering
PHD, University of Rochester, 2004

Reed, Helen L, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1981

Saric, William S, Distinguished Professor
Aerospace Engineering
PHD, Illinois Institute of Technology, 1968

Shryock, Kristi J, Instructional Associate Professor
Aerospace Engineering
PHD, Texas A&M University, 2011

Skelton, Robert E, Professor
Aerospace Engineering
PHD, University of California, Los Angeles, 1976

Strganac, Thomas W, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1987

Strouboulis, Theofanis, Professor
Aerospace Engineering
PHD, The University of Texas at Austin, 1986

Talreja, Ramesh R, Professor
Aerospace Engineering
PHD, The Technical University of Denmark, 1974

Tichenor, Nathan, Research Assistant Professor
Aerospace Engineering
PHD, Texas A&M University, 2010

Tropina, Albina, Research Professor
Aerospace Engineering
PHD, Kyiv Aviation University, 2011

Vadali, Srinivas R, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1983

Valasek, John L, Professor
Aerospace Engineering
PHD, University of Kansas, 1995

Whitcomb, John D, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1988

White, Edward B, Professor
Aerospace Engineering
PHD, Arizona State University, 2000
Majors

- Bachelor of Science in Aerospace Engineering (p. 353)

Minors

- Aerospace Engineering Minor (p. 354)

Aerospace Engineering - BS

Coursework in aerodynamics, structures and materials, propulsion, and dynamics and control provide a strong fundamental basis for advanced study and specialization, while technical electives offer a concentration of study in fields of special interest. Design philosophy and practice are developed throughout the curriculum to relate analysis to aerospace engineering design. The design of aerospace system components is particularly emphasized in the junior- and senior-level courses. A senior-level two-semester design sequence, involving specific goals, objectives, and constraints, integrates analysis and design tools and requires students working in small teams to design, build, test, and even fly an aerospace system, such as an aircraft, rocket, or spacecraft. Application of modern engineering and computational tools is required and emphasized in all courses.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering</td>
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</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics</td>
<td>4</td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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<td></td>
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Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering</td>
<td>2</td>
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</table>

Second Year

Fall

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<tr>
<td>AERO 201</td>
<td>Introduction to Flight</td>
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</tr>
<tr>
<td>AERO 212</td>
<td>Introduction to Aerothermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210 or COMM 205</td>
<td>Technical and Business Writing or Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td></td>
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</table>

Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>AERO 210</td>
<td>Introduction to Aerospace Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>AERO 214</td>
<td>Introduction to Aerospace Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>AERO 220</td>
<td>Introduction to Aerospace Computation</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
<td>3</td>
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<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
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<tr>
<td>High Impact Experience</td>
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<tr>
<td>AERO 299</td>
<td>Mid-Curriculum Professional Development</td>
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Third Year

Fall

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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>AERO 301</td>
<td>Theoretical Aerodynamics</td>
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</tr>
<tr>
<td>AERO 302</td>
<td>Aerospace Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>AERO 304</td>
<td>Aerospace Structural Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>AERO 310</td>
<td>Aerospace Dynamics</td>
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</tbody>
</table>
Aerospace Engineering - Minor

University Core Curriculum (p. 21) 3 6
Semester Credit Hours 17

Spring
AERO 303 High Speed Aerodynamics 3
AERO 306 Aerospace Structural Analysis II 3
AERO 321 Dynamics of Aerospace Vehicles 3
AERO 351 Aerothermodynamics and Propulsion 3

Semester Credit Hours 15

Fourth Year
Fall
AERO 401 Aerospace Vehicle Design I 5 3
AERO 413 Aerospace Materials Science 3
AERO 423 Orbital Mechanics 3
AERO 430 Numerical Simulation or MATH 401 or Advanced Engineering Mathematics 3
Select one of the following: 3
AERO 405 Aerospace Structural Design
AERO 417 Aerospace Propulsion
AERO 426 Space System Design
AERO 428 Electromagnetic Sensing for Space-Borne Imaging
AERO 472 Airfoil and Wing Design

Semester Credit Hours 15

Spring
AERO 402 Aerospace Vehicle Design II 5 2
AERO 422 Active Controls for Aerospace Vehicles 3
AERO 452 Heat Transfer and Viscous Flows 3
ENGR 482/PHIL 482 Ethics and Engineering 3
Select two of the following: 6
AERO 404 Mechanics of Advanced Aerospace Structures
AERO 405 Aerospace Structural Design
AERO 406 Polymer Nanocomposites and their Applications
AERO 417 Aerospace Propulsion
AERO 419 Chemical Rocket Propulsion
AERO 420 Aeroelasticity
AERO 424 Spacecraft Attitude Dynamics and Control
AERO 425 Flight Test Engineering
AERO 426 Space System Design
AERO 428 Electromagnetic Sensing for Space-Borne Imaging
AERO 430 Numerical Simulation
AERO 435 Aerothermochemistry
AERO 440 Cockpit Systems and Displays
AERO 445 Vehicle Management Systems
AERO 472 Airfoil and Wing Design
AERO 489 Special Topics in...
ECEN 421 Digital Control Systems

Semester Credit Hours 18

Total Semester Credit Hours 95

Three design options are available - Aircraft, Rocket, or Spacecraft Design. A two-semester sequence is required.

All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the AERO advising office.

Total Program Hours 128

Aerospace Engineering - Minor

The Department of Aerospace Engineering offers a minor in Aerospace Engineering.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERO 301</td>
<td>Theoretical Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>AERO 304</td>
<td>Aerospace Structural Analysis I</td>
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</tr>
<tr>
<td>AERO 310</td>
<td>Aerospace Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>AERO 303</td>
<td>High Speed Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>AERO 306</td>
<td>Aerospace Structural Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>AERO 321</td>
<td>Dynamics of Aerospace Vehicles</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Additional Requirements

- Overall GPR ≥ 2.50 when entering the minor field of study.
- Major GPR ≥2.50 when entering the minor field of study.
- Must earn C or higher to count as a minor field of study.

Prerequisites

- Approval to pursue the minor from Aerospace; completion of CBKs with a C or better.

Department of Biomedical Engineering

The objectives of the Biomedical Engineering program are to produce high-quality graduates with a broad-based education in engineering, life sciences and natural sciences applied to the fields of biomechanics, biomaterials, bioinstrumentation, and biomolecular and cellular engineering, who:

1. are well prepared for further graduate studies, careers in the biomedical or biotechnology industries or entry into medical or other professional schools;
2. will make significant contributions in biomedical industries, medicine and other sectors;
3. will apply acquired knowledge appropriately, work professionally with others, effectively communicate ideas and technical information and continue to learn and improve their knowledge base and skills.

These objectives are met through a modern and comprehensive curriculum taught by a well prepared, professionally active and dedicated
faculty. In addition, the program actively supports professional development among the students through individual study and research opportunities, cooperative education and internships, and student society activities. These goals are measured by the success of the graduates in finding rewarding professional employment, and by admission to respected graduate and professional schools.

Design is an important part of biomedical engineering and design skills are emphasized throughout the curriculum, beginning in the freshman year, and culminating in the two-semester senior design course sequence that requires application of a wide range of engineering methods to a focused design project. Other courses in biomedical engineering and in supporting disciplines include examples of the application of the principles to design, as well as specific design exercises. The biomedical engineering curriculum is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Before commencing coursework in the department, students must be admitted to the major or minor.

Faculty

Alge, Daniel L, Assistant Professor
Biomedical Engineering
PHD, Purdue University, 2010

Applegate, Brian E, Associate Professor
Biomedical Engineering
PHD, The Ohio State University, 2000

Bishop, Corey J, Assistant Professor
Biomedical Engineering
PHD, Johns Hopkins University School of Medicine, 2015

Biswa, Saurabh, Associate Professor of the Practice
Biomedical Engineering
PHD, Johns Hopkins University School of Medicine, 2015

Brewer, Maurice A, Professor of the Practice
Biomedical Engineering
MBA, Harvard Graduate School of Business Administration, 1984

Cosgriff-Hernandez, Elizabeth M, Associate Professor
Biomedical Engineering
PHD, Case Western Reserve University, 2005

Cote, Gerard L, Professor
Biomedical Engineering
PHD, University of Connecticut, 1990

Cricione, John C, Professor
Biomedical Engineering
PHD, Johns Hopkins University School of Medicine, 2005

Gaharwar, Akhilesh K, Assistant Professor
Biomedical Engineering
PHD, Purdue University, 2011

Gibbs, Holly C, Lecturer
Biomedical Engineering
PHD, Texas A&M University, 2015

Grunlan, Melissa A, Professor
Biomedical Engineering
PHD, University of South Carolina, 2004

Guiseppi Elie, Anthony, Professor
Biomedical Engineering
PHD, Massachusetts Institute of Technology, 1983

Huang, Shuning, Lecturer
Biomedical Engineering
PHD, Massachusetts Institute of Technology, 2009

Hwang, Wonmuk, Associate Professor
Biomedical Engineering
PHD, Boston University, 2001

Jafari, Roozbeh, Associate Professor
Biomedical Engineering
PHD, University of California, Los Angeles, 2006

Jain, Abhishek, Assistant Professor
Biomedical Engineering
PHD, Boston University, 2012

Jo, Javier A, Associate Professor
Biomedical Engineering
PHD, University of Southern California, 2002

Kaukas, Roland R, Associate Professor
Biomedical Engineering
PHD, University of California, San Diego, 2003

Keller, Brandis K, Lecturer
Biomedical Engineering
PHD, Politecnico di Milano, 2013

Madigan, Michael L, Professor
Biomedical Engineering
PHD, Virginia Commonwealth University, 2001

Maitland, Duncan J, Professor
Biomedical Engineering
PHD, Northwestern University, 1995

Maitland, Kristen D, Associate Professor
Biomedical Engineering
PHD, The University of Texas at Austin, 2006

McDougall, Mary P, Associate Professor
Biomedical Engineering
PHD, Texas A&M University, 2004

McShane, Michael J, Professor
Biomedical Engineering
PHD, Texas A&M University, 1999

Monroe, Mary Beth, Lecturer
Biomedical Engineering
PHD, Texas A&M University, 2013

Ober, Raimund J, Professor
Biomedical Engineering
PHD, Cambridge University, 1987

Thyparambil, Aby, Lecturer
Biomedical Engineering
PHD, Clemson University, 2015
Yakovlev, Vladislav V, Professor
Biomedical Engineering
PHD, Moscow State University, 1990

Yeh, Alvin T, Associate Professor
Biomedical Engineering
PHD, University of California, Berkeley, 2000

**Majors**

- Bachelor of Science in Biomedical Engineering (p. 356)

**Minors**

- Biomedical Engineering Minor (p. 358)

**Certificates**

- Engineering Therapeutics Manufacturing Certificate (p. 359)
- Quality Engineering for Regulated Medical Technologies Certificate (p. 359)

## Biomedical Engineering - BS

The curriculum in biomedical engineering involves the development and application of engineering science and technology for living and medical systems. Although there have been individuals working in biomedical engineering for centuries, today’s modern educational programs are specifically designed to prepare engineers for this challenging field. The curriculum described is broadly based around a basic core of courses developed to prepare students for team involvement with other engineers and with physicians and life scientists in working to solve a wide array of biological and medical problems. Elective courses are included to accommodate individual student specialty interests within the fields of biomechanics, biomaterials, bioinstrumentation, and biomolecular and cellular engineering. Students interested in medical school can meet admission prerequisites through slight modifications and additions to the curriculum.

### Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/102 or CHEM 107/108, CHEM 117 and CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/102 or CHEM 107/117 and CHEM 102/112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric 1</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I 1</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I 12</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics 1</td>
<td>4</td>
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<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
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</tr>
</tbody>
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**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students 1,4</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Laboratory</td>
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</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II 1</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II 1</td>
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<tr>
<td>PHYS 208</td>
<td>Electricity and Optics 1</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours** 17

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4. BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/107 or CHEM 107/117 and CHEM 102/112; Credit by Examination (CBE) for CHEM 101/107 or CHEM 107/117 plus CHEM 102/112; or 8 hours of CBE for CHEM 101/111 or CHEM 107/117 and CHEM 102/112.

### Second Year

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BMEN 101</td>
<td>Introduction to Biomedical Engineering</td>
<td>1</td>
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<tr>
<td>BMEN 207</td>
<td>Computing for Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II 1</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 203 or ENGL 210</td>
<td>Writing about Literature or Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
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<tr>
<td>VTPP 434</td>
<td>Physiology for Bioengineers I</td>
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**Semester Credit Hours** 18
### Spring

<table>
<thead>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BMEN 211</td>
<td>Biomedical Applications of Circuits, Signals and Systems</td>
<td>3</td>
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<tr>
<td>BMEN 253</td>
<td>Medical Device Design I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>3</td>
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<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
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<tr>
<td>VTPP 435</td>
<td>Physiology for Bioengineers II</td>
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University Core Curriculum (p. 21) 2 3

Semester Credit Hours 17

### Third Year

#### Fall

<table>
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<tr>
<td>BMEN 305</td>
<td>Bioinstrumentation</td>
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<td>BMEN 321</td>
<td>Biomedical Electronics</td>
<td>3</td>
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<tr>
<td>BMEN 341</td>
<td>Biofluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 343</td>
<td>Introduction to Biomaterials</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 350</td>
<td>Statistics for Biomedical Engineering</td>
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University Core Curriculum (p. 21) 2 3

Semester Credit Hours 16

### Spring

<table>
<thead>
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<tbody>
<tr>
<td>BMEN 344</td>
<td>Biological Responses to Medical Devices</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 345</td>
<td>Biomaterials Lab</td>
<td>1</td>
</tr>
<tr>
<td>BMEN 353</td>
<td>Medical Device Design II</td>
<td>1</td>
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<tr>
<td>BMEN 361</td>
<td>Biosolid Mechanics</td>
<td>3</td>
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<tr>
<td>BMEN 420</td>
<td>Medical Imaging</td>
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</table>

Technical elective 3 3

High Impact Experience 4 0

BMEN 399 | Engineering Professional Development                | 0                     |

Semester Credit Hours 14

### Fourth Year

#### Fall

<table>
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<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
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<tr>
<td>BMEN 453</td>
<td>Analysis and Design Project I</td>
<td>2</td>
</tr>
<tr>
<td>BMEN 452</td>
<td>Mass and Energy Transfer in Biosystems</td>
<td>3</td>
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<tr>
<td>BMEN 465</td>
<td>Biomechanics Experiential Learning Lab</td>
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Technical electives 3 6

University Core Curriculum (p. 21) 2 3

Semester Credit Hours 15

#### Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BMEN 450</td>
<td>Case Studies</td>
<td>1</td>
</tr>
<tr>
<td>BMEN 454</td>
<td>Analysis and Design Project II</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 482/PHIL 482</td>
<td>Ethics and Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

Technical electives 3 6

University Core Curriculum (p. 21) 2 3

Semester Credit Hours 15

Total Semester Credit Hours 95

---

1. A grade of C or better is required.

2. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts, 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences, and American history requirements if they are also on the approved list of international and cultural diversity courses.

3. Technical electives are to be selected from the course list below. Students must select a one of the following tracks and take 15 hours from within that track: Bioinstrumentation, Biomaterials, Biomechanics, or Biomolecular & Cellular Engineering. Course selection should be done in consultation with student’s advisor and track coordinator.

4. All students are required to complete a high-impact experience in order to graduate. A list of possible high-impact experiences is available in the BMEN advising office.

5. Writing intensive course.
Biomedical Engineering - Minor

The Department of Biomedical Engineering offers a minor to students within the College of Engineering who are interested in biomedical applications of engineering related to the sub-specialty fields of biomechanics, biomaterials, bioinstrumentation and biomolecular and cellular engineering. Eligible students must submit an application in order to be considered for and allowed to pursue a minor in Biomedical Engineering.

Requirements: In order to earn a Minor in Biomedical Engineering, students must meet and adhere to the following requirements and guidelines:

- Admitted into a College of Engineering major.
- In good academic standing within major department (GPR of 2.5 or higher).
- Maintain a cumulative 2.0 GPA in minor courses.
- Complete the courses listed for the selected Biomedical Engineering minor track.
- Following acceptance into a particular track, change of Biomedical Engineering minor track will not be permitted unless by petition and review by the Director of Undergraduate Programs.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIBS 243</td>
<td>Introductory Mammalian Histology</td>
<td>2</td>
</tr>
<tr>
<td>BMEN 101</td>
<td>Introduction to Biomedical Engineering</td>
<td>1</td>
</tr>
<tr>
<td>BMEN 253</td>
<td>Medical Device Design I</td>
<td></td>
</tr>
<tr>
<td>BMEN 450</td>
<td>Case Studies</td>
<td></td>
</tr>
<tr>
<td>BMEN 480</td>
<td>Biomedical Engineering of Tissues</td>
<td></td>
</tr>
<tr>
<td>BMEN 486</td>
<td>Biomedical Nanotechnology</td>
<td></td>
</tr>
</tbody>
</table>

Bioinstrumentation Area

- BMEN 321 Biomedical Electronics
- BMEN 420 Medical Imaging
- Bioinstrumentation technical electives

Biomaterials Area

- BMEN 343 Introduction to Biomaterials
- BMEN 344 Biological Responses to Medical Devices
- Biomaterials technical electives

Biomechanics Area

- BMEN 341 Biofluid Mechanics
- BMEN 361 Biosolid Mechanics

Select 12 hours from one area:

Select from the following to apply to any of the tracks above:

- BMEN 404 FDA Good Laboratory and Clinical Practices
- BMEN 406 Medical Device Path to Market
- BMEN 469 Entrepreneurial Issues in Biomedical Engineering
- ENGR 181 Engineering Honors Seminar I
- ENGR 281 Engineering Honors Mentoring & Team Building Seminar

Select from the following: 12-15

- BMEN 291 Research
- BMEN 491 Research
- BMEN 432 Molecular and Cellular Biomechanics
- BMEN 457 Orthopedic Biomechanics
- BMEN 458 Motion Biomechanics
- BMEN 461 Cardiac Mechanics
- BMEN 468 Advanced Biomechanics
- BMEN 471 Numerical Methods in Biomedical Engineering
- MEEN 363 Dynamics and Vibrations
- MEEN 368 Solid Mechanics in Mechanical Design
- MEEN 440 Bio-inspired Engineering Design
- MEEN 441 Design of Mechanical Components and Systems
- MEEN 442 Computer Aided Engineering
- MEEN 444 Finite Element Analysis in Mechanical Engineering

Biomolecular and Cellular Engineering

Required courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BMEN 431</td>
<td>Biomolecular Engineering</td>
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<tr>
<td>BMEN 433</td>
<td>Biomedical Engineering Laboratory</td>
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</tr>
</tbody>
</table>

Select from the following: 6-9

- BMEN 291 Research
- BMEN 491 Research
- BMEN 432 Molecular and Cellular Biomechanics
- BMEN 471 Numerical Methods in Biomedical Engineering
- BIOL 3 or Computational Genomics

Select up to one course from the following:

- BMEN 480 Biomedical Engineering of Tissues
- BMEN 486 Biomedical Nanotechnology
- BMEN 487 Drug Delivery

Select from the following to apply to any of the tracks above:

- BMEN 404 FDA Good Laboratory and Clinical Practices
- BMEN 406 Medical Device Path to Market
- BMEN 469 Entrepreneurial Issues in Biomedical Engineering
- ENGR 181 Engineering Honors Seminar I
- ENGR 281 Engineering Honors Mentoring & Team Building Seminar

400-Level BMEN with department approval (p. 745)
Biomechanics technical electives

<table>
<thead>
<tr>
<th>Total Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

Students must select courses exclusively from one of the three areas represented and not mixed.

Students may use up to 6 hours from their home department to satisfy minor requirements. The following substitutions will be allowed: BMEN 321 can be replaced by ECEN 214 or 215; BMEN 343 can be replaced by MEEN 222, CHEN 313, or MSENL 310; BMEN 361 can be replaced by CVEN 305 or MEEN 368. All substitutions must be approved by the BMEN academic advisor and director.

See the departmental academic advisor for a complete list of technical electives.

Students must be admitted to a degree sequence in the College of Engineering or to the degree sequence in Biological and Agricultural Engineering. Applications are available in the Biomedical Engineering Advising Office and will be reviewed on a competitive basis.

Engineering Therapeutics Manufacturing - Certificate

The Engineering Therapeutics Manufacturing Certificate is intended to meet the requirements of industry by educating engineering Bachelor of Science graduates how to economically, ecologically and safely design and operate equipment used for the production and separation of biological materials. By the end of the certificate program, students will be able to:

1. understand the processing of biological materials
2. analyze functions and properties of biological materials
3. understand the impact of the use/misuse of biological materials
4. understand the life cycle and evolution of biological materials
5. design, operate and optimize biological process units

For additional information, contact the Engineering Therapeutics Manufacturing Certificate coordinator or Engineering Academic and Student Affairs, Engineering Activities Building B, (979) 845-7200.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Required Course</td>
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<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td>BAEN 302</td>
<td>Biological and Agricultural Engineering Fundamentals II</td>
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<tr>
<td>BAEN 601</td>
<td>Advanced Agricultural Systems Analysis</td>
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<tr>
<td>CHEN 382</td>
<td>Bioprocess Engineering</td>
<td></td>
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<tr>
<td>CHEN 651</td>
<td>Biochemical Engineering</td>
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<tr>
<td>ISEN 360</td>
<td>Lean Thinking and Lean Engineering in the Process Industries</td>
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</tr>
<tr>
<td>ISEN 645</td>
<td>Lean Thinking and Lean Manufacturing</td>
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</tr>
<tr>
<td>VTPP 435</td>
<td>Physiology for Bioengineers II</td>
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<tr>
<td></td>
<td>Prescribed Electives</td>
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<td>Select three of the following:</td>
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<tr>
<td></td>
<td>BAEN 471/ Bioreactor Engineering</td>
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<tr>
<td></td>
<td>CHEN 471</td>
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<td></td>
<td>BAEN 479 Biological and Agricultural Engineering Design I</td>
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<td>BAEN 489 Special Topics in... (Introduction to Bioseparations)</td>
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<td>BAEN 631 Bioprocesses and Separations in Biotechnology</td>
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<td>BAEN 653 Bioreactor Design</td>
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<tr>
<td></td>
<td>BMEN 430 Medical Device Regulation</td>
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</tr>
<tr>
<td></td>
<td>BMEN 440 Design of Medical Devices</td>
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</tr>
<tr>
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<td>BMEN 486 Biomedical Nanotechnology</td>
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<td>BMEN 487 Drug Delivery</td>
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<tr>
<td></td>
<td>BMEN 630 Global Medical Device Regulation</td>
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<td>BMEN 640 Design of Medical Devices</td>
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<td>BMEN 653 Bioreactor Design</td>
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<td>BMEN 686 Biomedical Nanotechnology</td>
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<td>BMEN 687 Drug Delivery</td>
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<td>CHEN 440 Introduction to Transport Phenomena</td>
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<tr>
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<td>CHEN 463 Systems Biology</td>
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<td>CHEN 471/ Bioreactor Engineering</td>
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<tr>
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<td>CHEN 471</td>
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<tr>
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<td>CHEN 489 Special Topics in... (Bioprocess Control)</td>
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<td>or BAEN 489 Special Topics in...</td>
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<tr>
<td></td>
<td>CHEN 489 Special Topics in... (Bioreactor Design)</td>
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<td>CHEN 489 Special Topics in... (Introduction to Bioseparations)</td>
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<td></td>
<td>or BAEN or Special Topics in...</td>
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<tr>
<td></td>
<td>CHEN 489 Special Topics in... (Safety in Pharmaceutical and Biotechnology Industries)</td>
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<td></td>
<td>CHEN 489 Special Topics in... (Designing for Flexibility)</td>
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<td>CHEN 614 Advanced Transport Phenomena I</td>
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<td></td>
<td>CHEN 624 Chemical Engineering Kinetics and Reactor Design</td>
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<td>CHEN 629 Transport Phenomena</td>
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<td>CHEN 631 Process Dynamics and Advanced Process Control</td>
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<td>CHEN 655/ Process Safety Engineering</td>
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<td>SENG 655</td>
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<td></td>
<td>CHEN 663 Systems Biology</td>
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<td></td>
<td>ISEN 303 Engineering Economic Analysis</td>
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<tr>
<td></td>
<td>ISEN 613 Engineering Data Analysis</td>
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</table>

Total Semester Credit Hours 12

Quality Engineering for Regulated Medical Technologies - Certificate

Quality engineering principles are mandated by federal and state regulations for clinical facilities and for the design, testing and manufacture of medical technologies (such as pharmaceuticals and imaging, diagnostic and therapeutic devices). Completion of this
Program Requirements

<table>
<thead>
<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BMEN 440</td>
<td>Design of Medical Devices</td>
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<td>BMEN 640</td>
<td>Design of Medical Devices</td>
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<td>BMEN 404</td>
<td>FDA Good Laboratory and Clinical Practices</td>
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<td>BMEN 604</td>
<td>FDA Good Laboratory and Clinical Practices</td>
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</tr>
<tr>
<td>BMEN 406</td>
<td>Medical Device Path to Market</td>
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<tr>
<td>BMEN 606</td>
<td>Medical Device Path to Market</td>
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<tr>
<td>BMEN 430</td>
<td>Medical Device Regulation</td>
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<tr>
<td>BMEN 630</td>
<td>Global Medical Device Regulation</td>
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Select one of the following:

<table>
<thead>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ISEN 350</td>
<td>Quality Engineering</td>
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<td>ISEN 414</td>
<td>Total Quality Engineering</td>
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<tr>
<td>ISEN 614</td>
<td>Advanced Quality Control</td>
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<td>XXEN 485</td>
<td>Internship to be approved by certificate faculty</td>
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<tr>
<td>XXEN 684</td>
<td>to meet experience needs</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BMEN 404</td>
<td>FDA Good Laboratory and Clinical Practices</td>
<td>3</td>
</tr>
<tr>
<td>BMEN 604</td>
<td>FDA Good Laboratory and Clinical Practices</td>
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<td>BMEN 607</td>
<td>Clinical Engineering</td>
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<tr>
<td>BMEN 630</td>
<td>Global Medical Device Regulation</td>
<td></td>
</tr>
<tr>
<td>BMEN 440</td>
<td>Design of Medical Devices</td>
<td></td>
</tr>
<tr>
<td>BMEN 640</td>
<td>Design of Medical Devices</td>
<td></td>
</tr>
<tr>
<td>ISEN 350</td>
<td>Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>ISEN 414</td>
<td>Total Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>ISEN 614</td>
<td>Advanced Quality Control</td>
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<tr>
<td>ISEN 616</td>
<td>Design and Analysis of Industrial Experiments</td>
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<td>MMET 418</td>
<td>Medical Manufacturing</td>
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<tr>
<td>VTMI 629/SCSC 629</td>
<td>Laboratory Quality Systems</td>
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</tbody>
</table>

Total Semester Credit Hours 12

1 Course cannot be used to satisfy the required courses, and both the undergraduate and graduate versions of the same course cannot be used. For example, BMEN 404 and BMEN 604 cannot both count toward fulfilling requirements.

Artie McFerrin Department of Chemical Engineering

Chemical engineering is a broad field of engineering and thus requires a diverse preparation in science and engineering. Distinguishing chemical engineering from other engineering disciplines is its use of chemical and biochemical reactions to produce products and materials for society. Traditionally, chemical engineers have provided leadership in the petrochemical, refining, chemical, polymer, and food processing industries. Because of strengths in the foundation sciences of mathematics, chemistry, physics and biology, as well as in engineering, this leadership role has now extended to the biochemical, biomedical, high-tech materials, semi-conductor and microelectronics, nanotechnology, environmental quality, safety, and a host of other areas. Chemical engineers have consistently commanded starting salaries among the highest of all college graduates because of the combined breadth and depth of their education.

The mission of the Artie McFerrin Department of Chemical Engineering at Texas A&M is to educate and prepare students for national and international leadership roles in industry, government, and academia, to attract top students to chemical engineering; to define and develop new directions in chemical engineering fundamentals and practices, and in chemical engineering education and curricula; to be a valuable resource and service base to the State and to industry; and to provide leadership in solving problems of social and economic importance.

Objectives of the chemical engineering program are that

1. graduates will have successful chemical engineering careers in industry, academia or government,
2. graduates will obtain, apply and transfer knowledge across disciplines and into emerging areas of chemical engineering and related fields,
3. graduates will communicate effectively, be leaders in their fields and work competently in interdisciplinary teams, and
4. graduates will be professionally responsible and ethical and engage in professional activities to impact the society on a global scale.

To supplement coursework, well-equipped laboratories provide our students with experiences in operating and analyzing a variety of unit operations and process control equipment and in the use of the modern computational tools and software used in chemical engineering. The department offers vibrant undergraduate research, co-op and study abroad programs that provide students with additional enrichment and experiential opportunities.

The undergraduate program in Chemical Engineering at Texas A&M University is accredited by the Engineering Accreditation Commission of ABET, www.abet.org, and compares favorably with the best in the nation.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.
Faculty

Akbulut, Mustafa, Associate Professor
Chemical Engineering
PHD, University of California, Santa Barbara, 2007

Balbuena, Perla B, Professor
Chemical Engineering
PHD, The University of Texas at Austin, 1996

Cheng, Zheng Dong, Professor
Chemical Engineering
PHD, Princeton University, 1999

El-Halwagi, Mahmoud M, Professor
Chemical Engineering
PHD, University of California, Los Angeles, 1990

Elabd, Yossef A, Professor
Chemical Engineering
PHD, Johns Hopkins University, 2001

Green, Micah, Associate Professor
Chemical Engineering
PHD, Massachusetts Institute of Technology, 2007

Harris, James E, Professor of the Practice
Chemical Engineering
PHD, The University of Texas at Austin, 1981

Hasan, M M Faruque, Assistant Professor
Chemical Engineering
PHD, National University of Singapore, 2010

Hilaly, Ahmad K, Professor of the Practice
Chemical Engineering
PHD, Colorado State University, 2009

Holtzapple, Mark T, Professor
Chemical Engineering
PHD, University of Pennsylvania, 1981

Isdale, Charles E, Senior Lecturer
Chemical Engineering
MBA, Southern Illinois University Edwardsville, 1977

Jayaraman, Arul, Professor
Chemical Engineering
PHD, University of California, Irvine, 1998

Jeong, Hae-Kwon, Associate Professor
Chemical Engineering
PHD, University of Minnesota, Twin Cities, 2004

Kao, Katy C, Associate Professor
Chemical Engineering
PHD, University of California, Los Angeles, 2005

Karim, M. Nazmul, Professor
Chemical Engineering
PHD, University of Manchester, 1977

Khosraviangadikolaei, Homa, Research Assistant Professor
Chemical Engineering
PHD, University of Illinois at Chicago, 2013

Kravaris, Costas, Professor
Chemical Engineering
PHD, California Institute of Technology, 1984

Kuo, Yue, Professor
Chemical Engineering
PHD, Columbia University, 1980

Kwon, Joseph, Assistant Professor
Chemical Engineering
PHD, University of California, Los Angeles, 2015

Lele, Pushkar P, Assistant Professor
Chemical Engineering
PHD, University of Delaware, 2010

Lutkenhaus, Jodie L, Associate Professor
Chemical Engineering
PHD, University of Notre Dame, 2003

Mannan, Mahboobul, Professor
Chemical Engineering
PHD, University of Oklahoma, 1986

Mashuga, Chad V, Assistant Professor
Chemical Engineering
PHD, Michigan Technological University, 1999

Pistikopoulos, Efstratios, Professor
Chemical Engineering
PHD, Carnegie Mellon University, 1988

Rogers, William J, Lecturer
Chemical Engineering
PHD, The Ohio State University, 1976

Seminario, Jorge M, Professor
Chemical Engineering
PHD, Southern Illinois University Carbondale, 1987

Tamamis, Phanourios, Assistant Professor
Chemical Engineering
PHD, University of Cyprus, 2010

Ugaz, Victor M., Professor
Chemical Engineering
PHD, Northwestern University, 1999

Vaddiraju, Sreram, Associate Professor
Chemical Engineering
PHD, University of Louisville, 2006

White, James D, Senior Lecturer
Chemical Engineering
BA, Texas A&M University, 1978

Wilhite, Benjamin A, Associate Professor
Chemical Engineering
PHD, University of Notre Dame, 2003

Wilson, Christin M, Lecturer
Chemical Engineering
PHD, The Ohio State University, 2012
Chemical Engineering - BS

Wu, Hung-Jen, Assistant Professor
Chemical Engineering
PHD, Texas A&M University, 2006

Majors

- Bachelor of Science in Chemical Engineering (p. 362)

Minors

- Chemical Engineering Minor (p. 363)

Chemical Engineering - BS

The chemical engineering curriculum provides a balanced education in virtually all aspects of chemical engineering principles and practice and includes education in economics, language, philosophy and culture and communication. Chemical engineering courses emphasize fundamentals and methods that are applicable to the analysis, development, design and operation of a wide variety of chemical engineering systems and processes, thereby providing the necessary background for entry into the wide array of activities described above. At the same time, specific example applications provide the student with insight into the ability of chemical engineers to work in such a variety of areas. The curriculum is structured to offer students an opportunity to extend and apply the fundamentals developed in the basic courses toward more focused areas of specialization. The sequence of courses converges in the senior year into a comprehensive capstone design course that includes elements of economics, safety and environmental issues. The course provides an experience much like that of an industry design project. It is this philosophy of fundamentals, applications and design that has enabled our chemical engineering graduates to adapt readily to a dynamic and rapidly changing world and to solve problems they have not previously experienced.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
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<tr>
<td>ENGL 104</td>
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<td>ENGR 111</td>
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<td>MATH 151</td>
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<td>PHYS 218</td>
<td>4</td>
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Spring

| CHEM 102 & CHEM 112                 | 4                     |
| ENGR 112                           | 2                     |
| MATH 152                           | 4                     |
| PHYS 208                           | 4                     |
| University Core Curriculum (p. 21) | 3                     |
|                                    | 17                    |

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
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<td>CHEM 227 &amp; CHEM 237</td>
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<td>MATH 251</td>
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<td>University Core Curriculum (p. 21)</td>
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Spring

| CHEM 228 & CHEM 238                | 4                     |
| CHEN 205                           | 3                     |
| ENGL 210                           | 3                     |
| MATH 308                           | 3                     |
| University Core Curriculum (p. 21) | 3                     |
|                                    | 16                    |

Third Year

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<th>Fall</th>
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<tr>
<td>CHEM 316</td>
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<tr>
<td>CHEN 304</td>
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<td>CHEN 313</td>
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<tr>
<td>CHEN 320</td>
<td>3</td>
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<tr>
<td>CHEN 354</td>
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<td>University Core Curriculum (p. 21)</td>
<td>3</td>
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Spring

| CHEM 322                           | 3                     |
| CHEN 323                           | 3                     |
| CHEN 382                           | 3                     |
| CHEN 481                           | 1                     |
| ECEN 215 or MEEN 221               | 3                     |
| University Core Curriculum (p. 21) | 3                     |
|                                    | 16                    |

Fourth Year

<table>
<thead>
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<th>Fall</th>
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<tbody>
<tr>
<td>CHEN 414</td>
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<tr>
<td>CHEN 424</td>
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<tr>
<td>CHEN 425</td>
<td>3</td>
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<tr>
<td>CHEN 461</td>
<td>3</td>
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<tr>
<td>CHEN 464</td>
<td>3</td>
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<td>CHEN specialty options</td>
<td>3</td>
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Spring

| CHEN 426                           | 3                     |
| CHEN 433                           | 1                     |
| CHEN 455/SENG 455                  | 3                     |
|                                    | 16                    |
Chemical Engineering - Minor

The Department of Chemical Engineering offers a minor in Chemical Engineering.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEN 204</td>
<td>Elementary Chemical Engineering</td>
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<td>CHEN 313</td>
<td>Chemical Engineering Materials</td>
<td>3</td>
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<td>CHEN 354</td>
<td>Chemical Engineering Thermodynamics II</td>
<td>3</td>
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<tr>
<td>CHEM 322</td>
<td>Physical Chemistry for Engineers</td>
<td>3</td>
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<tr>
<td>CHEN 424</td>
<td>Chemical Engineering Mass Transfer Operations</td>
<td>3</td>
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<tr>
<td>CHEN 464</td>
<td>Kinetics and Reactor Design</td>
<td>3</td>
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</tbody>
</table>

Total Semester Credit Hours 18

Minimum GPR of 3.0 with at least 30 hours of Texas A&M credits completed.

Zachry Department of Civil Engineering

Civil Engineering

Civil engineers plan, design, supervise the construction, operate, maintain, inspect, retrofit, and manage many of the facilities and systems in both public and private sectors that are essential to modern life. The civil engineering profession is one of the most stable and most diverse of the engineering disciplines. Civil engineers are employed by consulting firms, public agencies, and start and operate their own business. Workplaces range from construction sites to design offices. Most civil engineers work with some engineering or construction aspect of private and/or public facilities, such as airports, bridges, buildings, coastal structures, dams, environmental remediation of contaminated sites, harbors, highways, offshore structures, pipelines, railroads, transportation systems, tunnels, water collection systems, water distribution systems, water and wastewater treatment facilities, and waterways. Civil engineers are on the forefront of applying the newest technology innovations in engineering and construction.

Civil engineering projects are unique because they require individual planning, analysis, design, construction supervision, performance monitoring, management and retrofitting. Civil engineering projects often require technical, governmental, legal, financial, and social evaluations. The primary objective is to provide the best service for the users while minimizing costs and other undesirable impacts.

The mission of the Zachry Department of Civil Engineering (http://engineering.tamu.edu/civil) at Texas A&M University is to prepare our graduates to become professional engineers and leaders in the civil engineering profession by providing our students with a solid education that will enable them to integrate fundamental scientific engineering principles and that will couple with the latest technological advances to facilitate the development of their problem solving skills. Additionally, the department provides opportunities for enhancement of the students’ educational experience through meaningful interactions with the profession, professionally-centered student activities and exposure to the broad field of civil engineering through seminars, practitioner visits, and Professional Day activities.

The faculty of the Zachry Department of Civil Engineering strives to ensure that our ever-evolving educational programs accomplish several objectives. First, our faculty must prepare the students to address the current and future civil engineering needs of the State of Texas, the nation and the world by being able to recognize the important geopolitical and public policy needs; and solve technical problems. In addition, the Department provides a curriculum that integrates scientific and technical knowledge with an appreciation for social, economic and political concerns. The curriculum and programs provide opportunities for our students to:

1. build leadership skills,
2. learn professionalism and ethical responsibility, and
3. develop and understanding of the need to engage in lifelong learning.

Finally, the faculty of the Zachry Department of Civil Engineering at Texas A&M University promotes the highest academic standards of excellence, quality, and ethics in both our undergraduate and graduate programs, and in doing so create both a culture of excellence and a community of scholars. Through our programs, our faculty and graduates provide local, state, national, and international leadership to a profession that must solve the civil engineering problems facing an increasingly complex society.

The program educational objectives for the undergraduate civil engineering program within the Department of Civil Engineering at Texas A&M University are to produce graduates:

1. who are prepared to enter civil engineering practice and/or continue their education through study in graduate and professional programs,
2. most of whom will become practicing civil engineers with most of these becoming licensed professional engineers, and
3. many of whom will pursue advanced studies.

The undergraduate program in civil engineering within the Zachry Department of Civil Engineering at Texas A&M is accredited by the Engineering Accreditation Commission of ABET, www.abet.org. Graduate programs in civil engineering are also available. These programs allow
further specialization and offer more in-depth study to address more complex technical and management issues. Graduate degrees also offer additional employment opportunities.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Faculty**

Appleton, Robert A, Associate Professor of the Practice
Civil Engineering
BS, Texas A&M University, 1984

Ardani, Samira, Assistant Lecturer
Civil Engineering
PHD, Texas A&M University, 2016

Aubeny, Charles P, Professor
Civil Engineering
PHD, Massachusetts Institute of Technology, 1992

Autenrieth, Robin L, Professor
Civil Engineering
PHD, Clarkson University, 1986

Barroso, Luciana R, Associate Professor
Civil Engineering
PHD, Stanford University, 1999

Batchelor, Bill, Senior Professor
Civil Engineering
PHD, Cornell University, 1976

Birely, Anna C, Assistant Professor
Civil Engineering
PHD, University of Washington, 2012

Birgisson, Bjorn, Professor
Civil Engineering
PHD, University of Minnesota, Twin Cities, 1996

Bracci, Joseph M, Professor
Civil Engineering
PHD, State University of New York at Buffalo, 1992

Brackin, Michael S, Assistant Lecturer
Civil Engineering
MS, Texas A&M University, 2010

Briaud, Jean-Louis, Professor
Civil Engineering
PHD, University of Ottawa, Canada, 1979

Brumbelow, James K, Associate Professor
Civil Engineering
PHD, Georgia Institute of Technology, 2001

Burris, Mark W, Professor
Civil Engineering
PHD, University of South Florida, 2001

Cahill, Anthony T, Associate Professor
Civil Engineering
PHD, Johns Hopkins University, 1998

Cha, Minsu, Assistant Professor
Civil Engineering
PHD, Georgia Institute of Technology, 2012

Chang, Kuang-An, Professor
Civil Engineering
PHD, Cornell University, 1999

Chellam, Shankararaman, Professor
Civil Engineering
PHD, Rice University, 1995

Chen, Hamn C, Professor
Civil Engineering
PHD, University of Iowa, 1982

Chinn, Timothy D, Professor of the Practice
Civil Engineering
BS, Texas A&M University, 1980

Chu, Kung-Hui, Associate Professor
Civil Engineering
PHD, University of California, Berkeley, 1998

Damnjanovic, Ivan, Associate Professor
Civil Engineering
PHD, The University of Texas at Austin, 2006

England, Peter S, Instructional Associate Professor
Civil Engineering
PHD, Texas Tech University, 2011

Ford, David N, Professor
Civil Engineering
PHD, Massachusetts Institute of Technology, 1995

Gao, Huilin, Assistant Professor
Civil Engineering
PHD, Princeton University, 2005

Gharaiheb, Nasir G, Associate Professor
Civil Engineering
PHD, University of Illinois at Urbana-Champaign, 1997

Grasley, Zachary C, Professor
Civil Engineering
PHD, University of Illinois at Urbana-Champaign, 2006

Hawkins, Harvey E, Professor
Civil Engineering
PHD, Texas A&M University, 1993

Hueste, Marybeth D, Professor
Civil Engineering
PHD, University of Michigan, 1997

Hurlebaus, Stefan, Professor
Civil Engineering
PHD, University of Stuttgart, Germany, 2002

Hutchinson, Richard N, Instructional Assistant Professor
Civil Engineering
MEN, Texas A&M University, 2001
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Department</th>
<th>Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Kaihatu, James M</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>University of Delaware, 1994</td>
<td></td>
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<tr>
<td>Kanta, Lufthansa R</td>
<td>Instructional Assistant Professor</td>
<td>Civil Engineering</td>
<td>Texas A&amp;M University, 2009</td>
<td></td>
</tr>
<tr>
<td>Keating, Peter B</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>Lehigh University, 1987</td>
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<tr>
<td>Koliou, Maria</td>
<td>Assistant Professor</td>
<td>Civil Engineering</td>
<td>State University of New York at Buffalo, 2014</td>
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<tr>
<td>Little, Dallas N</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>Texas A&amp;M University, 1979</td>
<td></td>
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<tr>
<td>London, Mara R</td>
<td>Instructional Associate Professor</td>
<td>Civil Engineering</td>
<td>The University of Texas at Austin, 2009</td>
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<tr>
<td>Lord, Dominique</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>University of Toronto, 2000</td>
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<tr>
<td>Lowery, Lee L</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>Texas A&amp;M University, 1967</td>
<td></td>
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<tr>
<td>Lytton, Robert L</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>The University of Texas at Austin, 1967</td>
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<tr>
<td>Ma, Xingmao</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>Missouri University of Science and Technology, 2004</td>
<td></td>
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<tr>
<td>Mander, John B</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>University of Canterbury, 1984</td>
<td></td>
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<tr>
<td>Martin, Amy E</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>University of California, Berkeley, 1997</td>
<td></td>
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<tr>
<td>Medina Cetina, Zenon</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>Johns Hopkins University, 2007</td>
<td></td>
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<tr>
<td>Mercier, Richard S</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>Massachusetts Institute of Technology, 1985</td>
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<tr>
<td>Miller, Gretchen R</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>University of California, Berkeley, 2009</td>
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<tr>
<td>Mostafavidarani, Ali</td>
<td>Assistant Professor</td>
<td>Civil Engineering</td>
<td>Purdue University, 2013</td>
<td></td>
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<tr>
<td>Niedzwecki, John M</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>The Catholic University of America, 1977</td>
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<tr>
<td>Noshadravan, Arash</td>
<td>Research Assistant Professor</td>
<td>Civil Engineering</td>
<td>University of Southern California, 2011</td>
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<tr>
<td>Olivera, Francisco</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>The University of Texas at Austin, 1996</td>
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<tr>
<td>Otey, Jeffrey M</td>
<td>Instructional Assistant Professor</td>
<td>Civil Engineering</td>
<td>Texas A&amp;M University, 1994</td>
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<td>Paal, Stephanie G</td>
<td>Assistant Professor</td>
<td>Civil Engineering</td>
<td>Georgia Institute of Technology, 2013</td>
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<tr>
<td>Pittman, Leslie W</td>
<td>Associate Professor of the Practice</td>
<td>Civil Engineering</td>
<td>Colorado State University, 1978</td>
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<tr>
<td>Quadrifoglio, Luca</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>University of Southern California, 2005</td>
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<tr>
<td>Rogers, Alton G</td>
<td>Associate Professor of the Practice</td>
<td>Civil Engineering</td>
<td>Texas A&amp;M University, 1976</td>
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<tr>
<td>Sakhaei Far, Maryam S</td>
<td>Assistant Professor</td>
<td>Civil Engineering</td>
<td>North Carolina State University, 2011</td>
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<tr>
<td>Sanchez Castilla, Marcelo Javier</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>Universidad Politecnica de Catalunya, Spain, 2004</td>
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<tr>
<td>Scarfuto, Jessica C</td>
<td>Assistant Lecturer</td>
<td>Civil Engineering</td>
<td>Texas A&amp;M University, 2014</td>
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<tr>
<td>Sideris, Petros</td>
<td>Assistant Professor</td>
<td>Civil Engineering</td>
<td>State University of New York at Buffalo, 2012</td>
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<tr>
<td>Socolofsky, Scott A</td>
<td>Professor</td>
<td>Civil Engineering</td>
<td>Massachusetts Institute of Technology, 2001</td>
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<tr>
<td>Talebpour, Alireza</td>
<td>Assistant Professor</td>
<td>Civil Engineering</td>
<td>Northwestern University, 2015</td>
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<td>Walewski, John A</td>
<td>Associate Professor of the Practice</td>
<td>Civil Engineering</td>
<td>The University of Texas at Austin, 2005</td>
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<td>Wang, Xiubin B</td>
<td>Associate Professor</td>
<td>Civil Engineering</td>
<td>University of California, Irvine, 2001</td>
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</table>
Wolf, Charles M, Professor of the Practice
Civil Engineering
DEN, Texas A&M University, 2001

Wurbs, Ralph A, Senior Professor
Civil Engineering
PHD, Colorado State University, 1978

Ying, Qi, Associate Professor
Civil Engineering
PHD, University of California, Davis, 2004

Zhang, Yulong, Professor
Civil Engineering
PHD, Virginia Polytechnic Institute and State University, 1996

Zollinger, Dan, Professor
Civil Engineering
PHD, University of Illinois at Urbana-Champaign, 1989

**Majors**

- Bachelor of Science in Civil Engineering (p. 366)
- Bachelor of Science in Civil Engineering, Coastal and Ocean Engineering Track (p. 367)
- Bachelor of Science in Civil Engineering, Construction Engineering and Management Track (p. 369)
- Bachelor of Science in Civil Engineering, Environmental Engineering Track (p. 371)
- Bachelor of Science in Civil Engineering, General Civil Engineering Track (p. 373)
- Bachelor of Science in Civil Engineering, Geotechnical Engineering Track (p. 376)
- Bachelor of Science in Civil Engineering, Structural Engineering Track (p. 377)
- Bachelor of Science in Civil Engineering, Transportation Engineering Track (p. 379)
- Bachelor of Science in Civil Engineering, Water Resources Engineering Track (p. 381)

**Civil Engineering - BS**

The first two years of the civil engineering curriculum build a solid foundation in mathematics, science and engineering science which are the necessary building blocks for a successful career in engineering. The third year provides an introduction to the various civil engineering disciplines and engineering principles, methods of analysis, and design. The fourth year provides the opportunity to pursue either a broad based program in general civil engineering or pursue more depth in an area of specialization by choice of one of eight tracks, described further below. The curriculum also includes courses in history, government/political science, social sciences, language, philosophy and culture and creative arts that help students:

1. understand the need for considering the global and societal context in which engineering solutions are completed,
2. understand professional and ethical responsibility, and
3. be knowledgeable of contemporary issues.

Students are encouraged to participate in cooperative education or to intern with civil engineering agencies during their undergraduate education.

All students must choose one of the eight tracks in the BS in Civil Engineering curriculum: construction engineering and management (p. 369), coastal and ocean (p. 367), environmental (p. 371), general (p. 373), geotechnical (p. 376), structural (p. 377), transportation (p. 379), and water resources (p. 381). The choice of track determines acceptable courses for technical electives listed in the general curriculum.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/111 or CHEM 107/117 and CHEM 102/112; Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/111 or CHEM 107/117 and CHEM 102/112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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### Spring

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
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<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Course</th>
<th>Semester Credit Hours</th>
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<tr>
<td>3</td>
<td>CVEN 207 Introduction to the Civil Engineering Profession</td>
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<tr>
<td>3</td>
<td>CVEN 221 Engineering Mechanics: Statics</td>
<td>3</td>
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<tr>
<td>3</td>
<td>MATH 251 Engineering Mathematics III</td>
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<tr>
<td>3</td>
<td>STAT 211 Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>COMM 205 Communication for Technical Professions or ENGL 210 Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
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<td></td>
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<tr>
<td>2</td>
<td>CVEN 250 Introduction to Graphics and Visualization and Applications in Civil Engineering Design</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>CVEN 302 Computer Applications in Engineering and Construction</td>
<td>3</td>
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<tr>
<td>3</td>
<td>CVEN 303 Civil Engineering Measurement</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>CVEN 305 Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>CVEN 306 Materials Engineering for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>MATH 308 Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CVEN 311 Fluid Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>CVEN 322 Civil Engineering Systems</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>CVEN 345 Theory of Structures</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>CVEN 363 Engineering Mechanics: Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Technical elective</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>CVEN 399 Mid-Curriculum Professional Development</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>BAEN 320 Engineering Thermodynamics</td>
<td>BAEN 320 Engineering Thermodynamics</td>
</tr>
<tr>
<td>3</td>
<td>ECEN 215 Principles of Electrical Engineering</td>
<td>ECEN 215 Principles of Electrical Engineering</td>
</tr>
<tr>
<td>3</td>
<td>MEEN 315 Principles of Thermodynamics</td>
<td>MEEN 315 Principles of Thermodynamics</td>
</tr>
<tr>
<td>9</td>
<td>Technical elective</td>
<td>9</td>
</tr>
<tr>
<td>15</td>
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</tr>
</tbody>
</table>

A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student's advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

**Total Program Hours 128**

**Civil Engineering, BS - Coastal and Ocean Engineering Track**

The Coastal and Ocean Engineering Track to fulfill the BS in Civil Engineering degree emphasizes breadth across civil engineering with a focus on coastal and offshore engineering. The focus electives prepare students to analyze and design systems for shallow and deep water environments. The track is appropriate for a career related to coastal and offshore engineering, and for those planning on further specialization in graduate studies.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112, Biomedical Engineering also requires a two semester sequence of chemistry courses consisting
Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

**Second Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CVEN 207</td>
<td>Introduction to the Civil Engineering Profession</td>
<td>1</td>
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<tr>
<td></td>
<td>CVEN 221</td>
<td>Engineering Mechanics: Statics</td>
<td>3</td>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CVEN 311</td>
<td>Fluid Dynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 322</td>
<td>Civil Engineering Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 345</td>
<td>Theory of Structures</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 363</td>
<td>Engineering Mechanics: Dynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Technical elective</td>
<td>5</td>
<td></td>
</tr>
<tr>
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<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>CVEN 399</td>
<td>Mid-Curriculum Professional Development</td>
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</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical elective</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
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<td></td>
</tr>
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<td>Semester Credit Hours</td>
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**Fourth Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CVEN 424</td>
<td>Civil Engineering Professional Practice</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Technical elective</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>ENGR 482/PHIL 482</td>
<td>Ethics and Engineering</td>
<td>3</td>
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<tr>
<td></td>
<td>Technical elective</td>
<td>5</td>
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</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>95</td>
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</table>
A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

Total Program Hours 128

Coastal and Ocean Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, Coastal and Ocean Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (10-11 semester credit hours), FOCUS courses (16 semester credit hours), and a CAPSTONE DESIGN course (3-4 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCIENCE Course (3 Semester Credit Hours Required)</td>
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</tr>
<tr>
<td>OCGN 401</td>
<td>Interdisciplinary Oceanography</td>
<td>3</td>
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<tr>
<td>or OCGN 41</td>
<td>or Physical Oceanography</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BREADTH Courses (10-11 Semester Credit Hours)</td>
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<tr>
<td>CVEN 365</td>
<td>Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 444</td>
<td>Structural Concrete Design</td>
<td>3</td>
</tr>
<tr>
<td>or CVEN 446</td>
<td>or Structural Steel Design</td>
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<tr>
<td>Choose 3 Semester Credit Hours From:</td>
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<td></td>
</tr>
<tr>
<td>CVEN 301</td>
<td>Environmental Engineering</td>
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</tr>
<tr>
<td>CVEN 339</td>
<td>Water Resources Engineering</td>
<td></td>
</tr>
<tr>
<td>CVEN 342</td>
<td>Materials of Construction</td>
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<tr>
<td>CVEN 343</td>
<td>Portland Cement Concrete Materials for Civil Engineers</td>
<td></td>
</tr>
<tr>
<td>CVEN 349</td>
<td>Civil Engineering Project Management</td>
<td></td>
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<td>Choose 1-2 Semester Credit Hours From:</td>
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<tr>
<td>OCGN 336</td>
<td>Fluid Dynamics Laboratory</td>
<td></td>
</tr>
<tr>
<td>OCGN 410</td>
<td>Ocean Engineering Laboratory</td>
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<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>FOCUS Courses (16 Semester Credit Hours Required)</td>
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</tr>
<tr>
<td>OCGN 300</td>
<td>Ocean Engineering Wave Mechanics</td>
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<tr>
<td>OCGN 481</td>
<td>Seminar</td>
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Choose 6 Semester Credit Hours From: 1

<table>
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<tbody>
<tr>
<td>OCGN 400</td>
<td>Basic Coastal Engineering</td>
<td></td>
</tr>
<tr>
<td>OCGN 402</td>
<td>Principles of Naval Architecture</td>
<td></td>
</tr>
<tr>
<td>OCGN 403</td>
<td>Dynamics of Offshore Structures</td>
<td></td>
</tr>
<tr>
<td>OCGN 475</td>
<td>Environmental Fluid Mechanics</td>
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Choose 6 Semester Credit Hours From:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCGN 362</td>
<td>Hydromechanics</td>
<td></td>
</tr>
<tr>
<td>OCGN 400</td>
<td>Basic Coastal Engineering</td>
<td></td>
</tr>
<tr>
<td>OCGN 401</td>
<td>Underwater Acoustics for Ocean Engineers</td>
<td></td>
</tr>
<tr>
<td>OCGN 402</td>
<td>Principles of Naval Architecture</td>
<td></td>
</tr>
<tr>
<td>OCGN 403</td>
<td>Dynamics of Offshore Structures</td>
<td></td>
</tr>
<tr>
<td>OCGN 407</td>
<td>Underwater and Moored System Design</td>
<td></td>
</tr>
<tr>
<td>OCGN 475</td>
<td>Environmental Fluid Mechanics</td>
<td></td>
</tr>
<tr>
<td>CVEN 402</td>
<td>Engineered Environmental Systems</td>
<td></td>
</tr>
<tr>
<td>CVEN 405</td>
<td>Construction Management of Field Operations</td>
<td></td>
</tr>
<tr>
<td>CVEN 423</td>
<td>Geomatics for Civil Engineering</td>
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</tr>
<tr>
<td>CVEN 435</td>
<td>Geotechnical Engineering Design</td>
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</tr>
<tr>
<td>CVEN 445</td>
<td>Matrix Methods of Structural Analysis</td>
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</tr>
<tr>
<td>CVEN 458</td>
<td>Hydraulic Engineering of Water Distribution Systems</td>
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</tr>
<tr>
<td>CVEN 473</td>
<td>Engineering Project Estimating and Planning</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CAPSTONE DESIGN Course (3-4 Semester Credit Hours Required)</td>
<td></td>
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</tr>
<tr>
<td>OCGN 407</td>
<td>Design of Ocean Engineering Facilities II</td>
<td>3-4</td>
</tr>
</tbody>
</table>

The sum of semester credit hours for Breadth and Capstone Design courses must be at least 14.

Civil Engineering - BS, Construction Engineering and Management Track

The Construction Engineering and Management Track to fulfill the BS in Civil Engineering degree emphasizes specialized coursework in the fundamentals of construction engineering and project management. The Track blends the principles of basic science, engineering, and technology with a strong component of business coursework. The Track is appropriate for students interested in a career in the construction industry.
Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering.

The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/ CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric (^1)</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I (^1)</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I (^1,2)</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics (^1)</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) (^3)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students (^1,4)</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory (^1)</td>
</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II (^1)</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II (^1)</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics (^1)</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) (^3)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>16</td>
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</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

Second Year

<table>
<thead>
<tr>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>CVEN 207</td>
<td>Introduction to the Civil Engineering Profession</td>
</tr>
<tr>
<td>CVEN 221</td>
<td>Engineering Mechanics: Statics</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>CVEN 210</td>
<td>or Technical and Business Writing</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) (^3)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>CVEN 250</td>
<td>Introduction to Graphics and Visualization Applications in Civil Engineering Design</td>
</tr>
<tr>
<td>CVEN 302</td>
<td>Computer Applications in Engineering and Construction</td>
</tr>
<tr>
<td>CVEN 303</td>
<td>Civil Engineering Measurement</td>
</tr>
<tr>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
</tr>
<tr>
<td>CVEN 306</td>
<td>Materials Engineering for Civil Engineers</td>
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<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
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<td><strong>Total Semester Credit Hours</strong></td>
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Third Year

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>CVEN 311</td>
<td>Fluid Dynamics</td>
</tr>
<tr>
<td>CVEN 322</td>
<td>Civil Engineering Systems</td>
</tr>
<tr>
<td>CVEN 345</td>
<td>Theory of Structures</td>
</tr>
<tr>
<td>CVEN 363</td>
<td>Engineering Mechanics: Dynamics</td>
</tr>
<tr>
<td>Technical elective (^5)</td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) (^3)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>CVEN 399</td>
<td>Mid-Curriculum Professional Development</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
</tr>
<tr>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
</tr>
<tr>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
</tr>
<tr>
<td>Technical elective (^5)</td>
<td>9</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) (^3)</td>
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<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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</table>

Fourth Year

<table>
<thead>
<tr>
<th></th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>CVEN 424</td>
<td>Civil Engineering Professional Practice (^6)</td>
</tr>
<tr>
<td>Technical elective (^5)</td>
<td>12</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) (^3)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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</tbody>
</table>

4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.
Technical electives for the BS in Civil Engineering, Construction Engineering and Management Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (18 semester credit hours), FOCUS courses (9 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 320</td>
<td>Geology for Civil Engineers</td>
<td>3</td>
</tr>
</tbody>
</table>

BREADTH Courses (18 Semester Credit Hours Required)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 307</td>
<td>Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 342</td>
<td>Materials of Construction</td>
<td>3</td>
</tr>
<tr>
<td>or CVEN 343</td>
<td>or Portland Cement Concrete</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 349</td>
<td>Civil Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 365</td>
<td>Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

FOCUS Courses (9 Semester Credit Hours Required)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 405</td>
<td>Construction Management of Field Operations</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 473</td>
<td>Engineering Project Estimating and Planning</td>
<td>3</td>
</tr>
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</table>

Choose 3 Semester Credit Hours From:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 403</td>
<td>Applied Civil Engineering Surveying</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
<td>3</td>
</tr>
<tr>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
<td>3</td>
</tr>
</tbody>
</table>

CAPSTONE DESIGN Course (3 Semester Credit Hours Required)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 400</td>
<td>Design Problems in Civil Engineering</td>
<td>3</td>
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</tbody>
</table>

CVEN 403 is a 2 semester credit hour course. Students must typically earn an additional 1 semester credit hour of Focus course credit and should consult with their advisors for guidance on appropriate courses with which to earn this credit.

Civil Engineering - BS, Environmental Engineering Track

The Environmental Engineering Track to fulfill the BS in Civil Engineering degree emphasizes specialized coursework in water and waste water treatment, air and water quality management, solid and hazardous wastes, ground water protection and remediation, and environmental policy. The track is appropriate for those wishing to pursue careers in protecting the natural environment from human activities, protecting human populations from the effects of adverse environmental factors and improving the environmental quality for human health and well-being.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however,
should be made with care to ensure that prerequisites for all courses are met.

### First Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>2</td>
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<td>MATH 151</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>4</td>
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<tr>
<td>University Core Curriculum (p. 2)</td>
<td>3</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 107</td>
<td>3</td>
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<tr>
<td>CHEM 117</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 112</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 2)</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total Semester Credit Hours

| 33 |

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4. BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/102/103 or CHEM 107/108/109 and CHEM 110/111/112; Credit by Examination (CBE) for CHEM 101/102/111 or CHEM 107/117 plus CHEM 102/112, or 8 hours of CBE for CHEM 101/111 or CHEM 107/117 and CHEM 102/112.

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CVEN 207</td>
<td>1</td>
</tr>
<tr>
<td>CVEN 221</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>3</td>
</tr>
<tr>
<td>STAT 211</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205 or ENGL 210</td>
<td>3</td>
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### University Core Curriculum (p. 2)

| 3 |

### Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CVEN 250</td>
<td>3</td>
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<tr>
<td>CVEN 302</td>
<td>3</td>
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<tr>
<td>CVEN 303</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 305</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 306</td>
<td>3</td>
</tr>
<tr>
<td>MATH 308</td>
<td>3</td>
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</table>

### Total Semester Credit Hours

| 16 |

### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CVEN 311</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 322</td>
<td>3</td>
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<tr>
<td>CVEN 345</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 363</td>
<td>3</td>
</tr>
<tr>
<td>Technical elective</td>
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#### Spring

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<td>BAEN 320</td>
<td>3</td>
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<tr>
<td>ECEN 215</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 315</td>
<td>3</td>
</tr>
<tr>
<td>Technical elective</td>
<td>9</td>
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<tr>
<td>University Core Curriculum (p. 2)</td>
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</table>

#### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CVEN 424</td>
<td>2</td>
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<td>12</td>
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<tr>
<td>University Core Curriculum (p. 2)</td>
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</tbody>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENGR 482/PHIL 482</td>
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<td>9</td>
</tr>
<tr>
<td>University Core Curriculum (p. 2)</td>
<td>3</td>
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</tbody>
</table>

#### Total Semester Credit Hours

| 95 |

5. A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.
All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses. A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

**Total Program Hours 128**

**Environmental Engineering Track - Technical Electives**

Technical electives for the BS in Civil Engineering, Environmental Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (7-12 semester credit hours), FOCUS courses (15-20 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCIENCE Course (3 Semester Credit Hours Required)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose 3 Semester Credit Hours From:</td>
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</tr>
<tr>
<td>ATMO 363</td>
<td>Introduction to Atmospheric Chemistry and Air Pollution</td>
<td></td>
</tr>
<tr>
<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
<td></td>
</tr>
<tr>
<td>BIOL 113</td>
<td>Essentials in Biology</td>
<td></td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>GEOS 105</td>
<td>Introduction to Environmental Geoscience</td>
<td></td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>BREADTH Courses (7 to 12 Semester Credit Hours Required)</td>
<td></td>
</tr>
<tr>
<td>CVEN 301</td>
<td>Environmental Engineering</td>
<td></td>
</tr>
<tr>
<td>CVEN 339</td>
<td>Water Resources Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose 3-9 Semester Credit Hours From:</td>
<td></td>
</tr>
<tr>
<td>CVEN 342</td>
<td>Materials of Construction</td>
<td></td>
</tr>
<tr>
<td>or CVEN 348</td>
<td>Portland Cement Concrete Materials for Civil Engineers</td>
<td></td>
</tr>
<tr>
<td>CVEN 365</td>
<td>Introduction to Geotechnical Engineering</td>
<td></td>
</tr>
<tr>
<td>CVEN 403</td>
<td>Applied Civil Engineering Surveying</td>
<td></td>
</tr>
<tr>
<td>OCEN 336</td>
<td>Fluid Dynamics Laboratory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose 0-3 Semester Credit Hours From:</td>
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</tr>
<tr>
<td>CVEN 307</td>
<td>Transportation Engineering</td>
<td></td>
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<tr>
<td>CVEN 349</td>
<td>Civil Engineering Project Management</td>
<td></td>
</tr>
<tr>
<td>CVEN 444</td>
<td>Structural Concrete Design</td>
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<table>
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<tbody>
<tr>
<td></td>
<td>FOCUS Courses (15 to 20 Semester Credit Hours Required)</td>
<td></td>
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<td>Choose 6-9 Semester Credit Hours From:</td>
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</tr>
<tr>
<td>CVEN 402</td>
<td>Engineered Environmental Systems</td>
<td></td>
</tr>
<tr>
<td>CVEN 406</td>
<td>Environmental Protection and Public Health</td>
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</tr>
<tr>
<td>CVEN 413</td>
<td>Natural Environmental Systems</td>
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<td></td>
<td>Choose 6-14 Semester Credit Hours From:</td>
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<tr>
<td>BAEN 465</td>
<td>Design of Biological Waste Treatment Systems</td>
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</tr>
<tr>
<td>BAEN 469</td>
<td>Water Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>BAEN 477</td>
<td>Air Pollution Engineering</td>
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<tr>
<td>CVEN 423</td>
<td>Geomatics for Civil Engineers</td>
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<tr>
<td>CVEN 451</td>
<td>Public Works Engineering</td>
<td></td>
</tr>
<tr>
<td>CVEN 455</td>
<td>Urban Stormwater Management</td>
<td></td>
</tr>
<tr>
<td>CVEN 458</td>
<td>Hydraulic Engineering of Water Distribution Systems</td>
<td></td>
</tr>
<tr>
<td>CVEN 462</td>
<td>Engineering Hydrogeology</td>
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</tr>
<tr>
<td>CVEN 463</td>
<td>Engineering Hydrology</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAPSTONE DESIGN Course (3 Semester Credit Hours Required)</td>
<td></td>
</tr>
<tr>
<td>CVEN 400</td>
<td>Design Problems in Civil Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

1 The sum of semester credit hours of Breadth and Focus courses must be at least 27.

**Civil Engineering - BS, General Civil Engineering Track**

The General Civil Engineering Track to fulfill the BS in Civil Engineering degree emphasizes breadth across the civil engineering field. Students take courses in all major sub-disciplines of civil engineering with an advanced focus elective allowing deeper learning in one area. The track is appropriate for a career in any area of civil engineering, with particular relevance for those interested in public works, land development, and general civil, and for those planning on further specialization in graduate studies.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112, Biomedical Engineering also
requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric 1</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I 1</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I 1,2</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics 1</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) 3</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>16</td>
</tr>
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</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students 1,4</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory 1</td>
</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II 1</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II 1</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics 1</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) 3</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 207</td>
<td>Introduction to the Civil Engineering Profession</td>
</tr>
</tbody>
</table>

Third Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 221</td>
<td>Engineering Mechanics: Statics</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
</tr>
<tr>
<td>COMM 205 or ENGL 210</td>
<td>Communication for Technical Professions or Technical and Business Writing</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) 3</td>
<td>3</td>
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<tr>
<td>Total Semester Credit Hours</td>
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Spring

<table>
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<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CVEN 250</td>
<td>Introduction to Graphics and Visualization Applications in Civil Engineering Design</td>
</tr>
<tr>
<td>CVEN 302</td>
<td>Computer Applications in Engineering and Construction</td>
</tr>
<tr>
<td>CVEN 303</td>
<td>Civil Engineering Measurement</td>
</tr>
<tr>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
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<tr>
<td>CVEN 306</td>
<td>Materials Engineering for Civil Engineers</td>
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<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
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Fourth Year

Fall

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<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 311</td>
<td>Fluid Dynamics</td>
</tr>
<tr>
<td>CVEN 322</td>
<td>Civil Engineering Systems</td>
</tr>
<tr>
<td>CVEN 345</td>
<td>Theory of Structures</td>
</tr>
<tr>
<td>CVEN 363</td>
<td>Engineering Mechanics: Dynamics</td>
</tr>
<tr>
<td>Technical elective 5</td>
<td>9</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) 3 5</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 399</td>
<td>Mid-Curriculum Professional Development</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
</tr>
<tr>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
</tr>
<tr>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
</tr>
<tr>
<td>Technical elective 5</td>
<td>9</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) 3 5</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112, or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.
A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

Total Program Hours 128
General Civil Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, General Civil Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (24 semester credit hours), a FOCUS course (3 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCIENCE Course (3 Semester Credit Hours Required)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose 3 Semester Credit Hours From:</td>
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</tr>
<tr>
<td></td>
<td>ATMO 201 Weather and Climate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BESC 201 Introduction to Bioenvironmental Sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 113 Essentials in Biology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEO 203 Planet Earth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEO 320 Geology for Civil Engineers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 410 Hydrogeology</td>
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<tr>
<td></td>
<td>GEOS 105 Introduction to Environmental Geoscience</td>
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<tr>
<td></td>
<td>OCNG 410 Physical Oceanography</td>
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</tr>
<tr>
<td></td>
<td>RENR 205 Fundamentals of Ecology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RENR 375 Conservation of Natural Resources</td>
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<td></td>
<td>Code Title Semester Credit Hours Code Title Semester Credit Hours</td>
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</tr>
<tr>
<td></td>
<td>BREADTH Courses (24 Semester Credit Hours Required)</td>
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<tr>
<td></td>
<td>CVEN 301 Environmental Engineering</td>
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<td>CVEN 307 Transportation Engineering</td>
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<tr>
<td></td>
<td>CVEN 339 Water Resources Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 342 Materials of Construction or CVEN 343 or Portland Cement Concrete Materials for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 349 Civil Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 365 Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 444 Structural Concrete Design</td>
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</tr>
<tr>
<td></td>
<td>CVEN 446 Structural Steel Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Code Title Semester Credit Hours Code Title Semester Credit Hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FOCUS Course (3 Semester Credit Hours Required)</td>
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<tr>
<td></td>
<td>Choose 3 Semester Credit Hours From:</td>
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<tr>
<td></td>
<td>CVEN 402 Engineered Environmental Systems</td>
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<tr>
<td></td>
<td>CVEN 403 Applied Civil Engineering Surveying</td>
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</tr>
<tr>
<td></td>
<td>CVEN 405 Construction Management of Field Operations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 406 Environmental Protection and Public Health</td>
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</tr>
<tr>
<td></td>
<td>CVEN 413 Natural Environmental Systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 417 Bituminous Materials</td>
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<tr>
<td></td>
<td>CVEN 418 Highway Materials and Pavement Design</td>
<td></td>
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<tr>
<td></td>
<td>CVEN 423 Geomatics for Civil Engineering</td>
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<td>CVEN 435 Geotechnical Engineering Design</td>
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<tr>
<td></td>
<td>CVEN 445 Matrix Methods of Structural Analysis</td>
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<tr>
<td></td>
<td>CVEN 451 Public Works Engineering</td>
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</tr>
<tr>
<td></td>
<td>CVEN 454 Urban Planning for Engineers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 455 Urban Stormwater Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 456 Highway Design</td>
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<tr>
<td></td>
<td>CVEN 457 Urban Traffic Facilities</td>
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<tr>
<td></td>
<td>CVEN 458 Hydraulic Engineering of Water Distribution Systems</td>
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<tr>
<td></td>
<td>CVEN 462 Engineering Hydrogeology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 463 Engineering Hydrology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 473 Engineering Project Estimating and Planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OCEN 400 Basic Coastal Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Code Title Semester Credit Hours Code Title Semester Credit Hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAPSTONE DESIGN Course (3 Semester Credit Hours Required)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVEN 400 Design Problems in Civil Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

1 CVEN 403 is a 2 semester credit hour course. Students must typically earn an additional 1 semester credit hour of Focus course credit and should consult with their advisors for guidance on appropriate courses with which to earn this credit.
Civil Engineering - BS, Geotechnical Engineering Track

The Geotechnical Engineering Track to fulfill the BS in Civil Engineering degree emphasizes specialized coursework in applied soil mechanics and foundation engineering, as well as civil engineering sub-disciplines with strong geotechnical engineering connections such as structures, water resources, construction, transportation, environmental, coastal and ocean engineering. The track is appropriate for those wishing to pursue careers in engineering design and management of infrastructure in a wide array of sectors that can include energy, transportation, and water resources.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111 Foundations of Engineering I</td>
<td>2</td>
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<tr>
<td>MATH 151 Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218 Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>16</td>
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</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 107 General Chemistry for Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 117 General Chemistry for Engineering Students</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 112 Foundations of Engineering II</td>
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</tr>
<tr>
<td>MATH 152 Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208 Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>17</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 33

A grade of C or better is required.

2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.

3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CVEN 207 Introduction to the Civil Engineering Profession</td>
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<tr>
<td>CVEN 221 Engineering Mechanics: Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251 Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>STAT 211 Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205 Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210 Technical and Business Writing</td>
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<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 250 Introduction to Graphics and Visualization Applications in Civil Engineering Design</td>
<td>2</td>
</tr>
<tr>
<td>CVEN 302 Computer Applications in Engineering and Construction</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 303 Civil Engineering Measurement</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 305 Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 306 Materials Engineering for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 308 Differential Equations</td>
<td>3</td>
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<tr>
<td>Semester Credit Hours</td>
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</table>

Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CVEN 311 Fluid Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 322 Civil Engineering Systems</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 345 Theory of Structures</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 363 Engineering Mechanics: Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>Technical elective</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
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</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 399 Mid-Curriculum Professional Development</td>
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</tr>
<tr>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>BAEN 320 Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 215 Principles of Electrical Engineering</td>
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</tr>
</tbody>
</table>
### Total Program Hours 128

#### Geotechnical Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, Geotechnical Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (18 semester credit hours), FOCUS courses (9 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 320</td>
<td>Geology for Civil Engineers</td>
<td>3</td>
</tr>
</tbody>
</table>

5 A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

6 All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

### Code Title Semester Credit Hours

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
</table>

#### BREADTH Courses (18 Semester Credit Hours Required; All Courses in this List Should Be Taken)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 301</td>
<td>Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 339</td>
<td>Water Resources Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 342</td>
<td>Materials of Construction</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 343 or CVEN 344</td>
<td>Portland Cement Concrete or Portland Cement Concrete Materials for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 349</td>
<td>Civil Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 365</td>
<td>Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 444</td>
<td>Structural Concrete Design</td>
<td>3</td>
</tr>
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</table>

#### FOCUS Courses (9 Semester Credit Hours Required)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 403</td>
<td>Applied Civil Engineering Surveying</td>
<td>1</td>
</tr>
<tr>
<td>CVEN 405</td>
<td>Construction Management of Field Operations</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 417</td>
<td>Bituminous Materials</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 418</td>
<td>Highway Materials and Pavement Design</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 436</td>
<td>Case Histories in Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 446</td>
<td>Structural Steel Design</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 463</td>
<td>Engineering Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>OCEN 400</td>
<td>Basic Coastal Engineering</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 440</td>
<td>Engineering Geology</td>
<td>3</td>
</tr>
</tbody>
</table>

#### CAPSTONE DESIGN Course (3 Semester Credit Hours Required)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 307</td>
<td>Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 403</td>
<td>Applied Civil Engineering Surveying</td>
<td>1</td>
</tr>
<tr>
<td>CVEN 405</td>
<td>Construction Management of Field Operations</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 417</td>
<td>Bituminous Materials</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 418</td>
<td>Highway Materials and Pavement Design</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 436</td>
<td>Case Histories in Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 446</td>
<td>Structural Steel Design</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 463</td>
<td>Engineering Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>OCEN 400</td>
<td>Basic Coastal Engineering</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Hydrogeology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 440</td>
<td>Engineering Geology</td>
<td>3</td>
</tr>
</tbody>
</table>

1 CVEN 403 is a 2 semester credit hour course. Students must typically earn an additional 1 semester credit hour of Focus course credit and should consult with their advisors for guidance on appropriate courses with which to earn this credit.

### Civil Engineering - BS, Structural Engineering Track

The Structural Engineering track to fulfill the BS in Civil Engineering degree provides coursework in the areas of structural mechanics and structural analysis that equip the student to analyze and design the...
frameworks that support buildings, bridges, offshore installations and civil infrastructure projects. This track is appropriate for those with strong analytical and computing skills wishing to apply them in the design of engineered facilities. Structural engineers create simulation models of structural systems and use them to properly proportion the beams, columns and floor systems found in buildings and other civil projects to safely resist the forces found in their environment.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 112, Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
<tr>
<td></td>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
</tr>
<tr>
<td></td>
<td>PHYS 218</td>
<td>Mechanics</td>
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<tr>
<th>Semester</th>
<th>Course</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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<tr>
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<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
</tr>
<tr>
<td></td>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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### Second Year

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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>CVEN 207</td>
<td>Introduction to the Civil Engineering Profession</td>
</tr>
<tr>
<td></td>
<td>CVEN 221</td>
<td>Engineering Mechanics: Statics</td>
</tr>
<tr>
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<td>MATH 251</td>
<td>Engineering Mathematics III</td>
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<td></td>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
</tr>
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<td></td>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td></td>
<td>or ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
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<td><strong>Spring</strong></td>
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<td>CVEN 302</td>
<td>Computer Applications in Engineering and Construction</td>
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<td>CVEN 303</td>
<td>Civil Engineering Measurement</td>
</tr>
<tr>
<td></td>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
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<td>CVEN 306</td>
<td>Materials Engineering for Civil Engineers</td>
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<td>MATH 308</td>
<td>Differential Equations</td>
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### Third Year

<table>
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<tr>
<td><strong>Fall</strong></td>
<td>CVEN 311</td>
<td>Fluid Dynamics</td>
</tr>
<tr>
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<td>CVEN 322</td>
<td>Civil Engineering Systems</td>
</tr>
<tr>
<td></td>
<td>CVEN 345</td>
<td>Theory of Structures</td>
</tr>
<tr>
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<td>CVEN 363</td>
<td>Engineering Mechanics: Dynamics</td>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td>CVEN 399</td>
<td>Mid-Curriculum Professional Development</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
</tr>
<tr>
<td></td>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
</tr>
<tr>
<td></td>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
</tr>
<tr>
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<td>Technical elective</td>
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<tr>
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<td><strong>Total Semester Credit Hours</strong></td>
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</tr>
</tbody>
</table>

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4. BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.
A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

**Total Program Hours 128**

### Structural Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, Structural Engineering Track are composed of a SCIENCE course (3 semester credit hours), a MATH course (3 semester credit hours), BREADTH courses (15 semester credit hours), FOCUS courses (9 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
</table>

**SCIENCE Course (3 Semester Credit Hours Required)**

Choose 3 Semester Credit Hours From:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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</table>

**MATH Course (3 Semester Credit Hours Required)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</table>

**BREADTH Courses (15 Semester Credit Hours Required)**

<table>
<thead>
<tr>
<th>Code</th>
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**FOCUS Courses (9 Semester Credit Hours Required)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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**CAPSTONE DESIGN Course (3 Semester Credit Hours Required)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
</table>

1. MATH 304 is preferred.

### Civil Engineering - BS, Transportation Engineering Track

The Transportation Engineering Track to fulfill the BS in Civil Engineering degree emphasizes specialized coursework in transportation engineering areas of planning, design, and operations, as well as civil engineering sub-disciplines with strong transportation connections such as water resources, construction, and geotechnical. The track is appropriate for
those wishing to pursue careers in engineering related to the planning, design, construction, operation, and maintenance of various elements of the transportation system, including roads, rail, transit, and aviation.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall</th>
<th>Spring</th>
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<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric 1</td>
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<td>ENGR 111</td>
<td>Foundations of Engineering I 1</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I 1 2</td>
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<tr>
<td></td>
<td>PHYS 218</td>
<td>Mechanics 1</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21) 3</td>
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</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students 1 4</td>
</tr>
<tr>
<td></td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory 1</td>
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<tr>
<td></td>
<td>ENGR 112</td>
<td>Foundations of Engineering II 1</td>
</tr>
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<td>MATH 152</td>
<td>Engineering Mathematics II 1</td>
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<td></td>
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<td>Electricity and Optics 1</td>
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<td>University Core Curriculum (p. 21) 3</td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td></td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.

2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.

3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.
University Core Curriculum (p. 21) 3

Semester Credit Hours 15

Fourth Year

Fall

CVEN 424 Civil Engineering Professional Practice 6 2
Technical elective 5 12
University Core Curriculum (p. 21) 3 3

Semester Credit Hours 17

Spring

ENGR 482/PHIL 482 Ethics and Engineering 6 3
Technical elective 5 9
University Core Curriculum (p. 21) 3 3

Semester Credit Hours 15

Total Semester Credit Hours 95

5 A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

6 All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

Total Program Hours 128

Transportation Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, Transportation Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (12-18 semester credit hours), FOCUS courses (9-15 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

Code Title Semester Credit Hours

SCIENCE Course (3 Semester Credit Hours Required)

Choose 3 Semester Credit Hours From:

ATMO 201 Weather and Climate
BESC 201 Introduction to Bioenvironmental Sciences
GEOG 203 Planet Earth
GEOL 320 Geology for Civil Engineers

GEOS 105 Introduction to Environmental Geoscience

BREADTH Courses (12-18 Semester Credit Hours Required) 1

CVEN 307 Transportation Engineering 3
CVEN 342 Materials of Construction or CVEN 343 or Portland Cement Concrete Materials for Civil Engineers 3
CVEN 444 Structural Concrete Design 3

Choose 3-9 Semester Credit Hours From:

CVEN 301 Environmental Engineering
CVEN 339 Water Resources Engineering
CVEN 349 Civil Engineering Project Management
CVEN 365 Introduction to Geotechnical Engineering
CVEN 446 Structural Steel Design

FOCUS Courses (9-15 Semester Credit Hours Required) 1

CVEN 454 Urban Planning for Engineers 3
CVEN 457 Urban Traffic Facilities 3

Choose 3-9 Semester Credit Hours From:

CVEN 403 Applied Civil Engineering Surveying 2

CVEN 417 Bituminous Materials
CVEN 418 Highway Materials and Pavement Design
CVEN 423 Geomatics for Civil Engineering
CVEN 451 Public Works Engineering
CVEN 455 Urban Stormwater Management
ISEN 330 Human Systems Interaction

Code Title Semester Credit Hours

CAPSTONE DESIGN Course (3 Semester Credit Hours Required)

CVEN 456 Highway Design 3

1 The sum of semester credit hours of Breadth and Focus courses must be at least 27.

2 CVEN 403 is a 2 semester credit hour course. Students must typically earn an additional 1 semester credit hour of Focus course credit and should consult with their advisors for guidance on appropriate courses with which to earn this credit.

Civil Engineering - BS, Water Resources Engineering Track

The Water Resources Engineering Track to fulfill the BS in Civil Engineering degree emphasizes specialized coursework in applied hydraulics and hydrology as well as civil engineering sub-disciplines
with strong water resources connections such as environmental, transportation, geotechnical, and coastal engineering. The track is appropriate for those wishing to pursue careers in engineering design and management for water quantity and quality issues.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

**First Year**

**Fall**

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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
<td>2</td>
</tr>
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<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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**Spring**

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<tr>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
<td>2</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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**Second Year**

**Fall**

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<td>CVEN 207</td>
<td>Introduction to the Civil Engineering Profession</td>
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<td>CVEN 221</td>
<td>Engineering Mechanics: Statics</td>
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<td>MATH 251</td>
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<td>STAT 211</td>
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**Spring**

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<td>CVEN 250</td>
<td>Introduction to Graphics and Visualization Applications in Civil Engineering Design</td>
<td>2</td>
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<td>CVEN 302</td>
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<td>CVEN 303</td>
<td>Civil Engineering Measurement</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
<td>3</td>
</tr>
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<td>CVEN 306</td>
<td>Materials Engineering for Civil Engineers</td>
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<td>Differential Equations</td>
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**Third Year**

**Fall**

<table>
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<tr>
<th>Course</th>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CVEN 311</td>
<td>Fluid Dynamics</td>
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<td>CVEN 322</td>
<td>Civil Engineering Systems</td>
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<tr>
<td>CVEN 345</td>
<td>Theory of Structures</td>
<td>3</td>
</tr>
<tr>
<td>CVEN 363</td>
<td>Engineering Mechanics: Dynamics</td>
<td>3</td>
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<tr>
<td>Technical elective</td>
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**Spring**

<table>
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<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CVEN 399</td>
<td>Mid-Curriculum Professional Development</td>
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<tr>
<td>Select one of the following:</td>
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<td>3</td>
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<tr>
<td>BAEN 320</td>
<td>Engineering Thermodynamics</td>
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<tr>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
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<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
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</tr>
<tr>
<td>Technical elective</td>
<td></td>
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</tr>
</tbody>
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1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4. BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.
University Core Curriculum (p. 21)  

Semester Credit Hours 3

Fourth Year

Fall
CVEN 424  Civil Engineering Professional Practice  2
Technical elective  5
University Core Curriculum (p. 21)  3

Semester Credit Hours 15

Spring
ENGR 482/PHIL 482  Ethics and Engineering  3
Technical elective  9
University Core Curriculum (p. 21)  3

Semester Credit Hours 17

Total Semester Credit Hours 95

A total of 33 hours of technical electives is required. Technical electives are divided into four categories: science courses, breadth courses, focus courses, and capstone design courses. The choice of courses to be taken in each of the four categories depends on the track chosen and must be made in consultation with the student’s advisor and/or the Civil Engineering Undergraduate Student Services Office. Capstone design courses must include more than one civil engineering context.

All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and CVEN 424 taken at Texas A&M satisfy this requirement. Other CVEN courses may be approved as W courses at a later date. A grade of C or better is required in these courses.

A grade of C or better is required in all science, mathematics and engineering courses taken to satisfy degree requirements.

Total Program Hours 128

Water Resources Engineering Track - Technical Electives

Technical electives for the BS in Civil Engineering, Water Resources Engineering Track are composed of a SCIENCE course (3 semester credit hours), BREADTH courses (15 semester credit hours), FOCUS courses (12 semester credit hours), and a CAPSTONE DESIGN course (3 semester credit hours), as delineated below, for a total of 33 semester credit hours. A substitution for any course in the track must be approved in writing by the Civil Engineering Undergraduate Student Services Office, CE Building, Room 141.

Code  Title  Semester Credit Hours

SCIENCE Course (3 Semester Credit Hours Required)
Choose 3 Semester Credit Hours From:
ATMO 201  Weather and Climate
BIOL 206  Introductory Microbiology
GEOL 320  Geology for Civil Engineers
GEOL 410  Hydrogeology
RENR 205  Fundamentals of Ecology

BREADTH Courses (15 Semester Credit Hours Required)
CVEN 301  Environmental Engineering
CVEN 307  Transportation Engineering
CVEN 339  Water Resources Engineering
CVEN 342  Materials of Construction or CVEN 343  Portland Cement Concrete Materials for Civil Engineers
CVEN 365  Introduction to Geotechnical Engineering

FOCUS Courses (12 Semester Credit Hours Required)
Choose 6-12 Semester Credit Hours From:
CVEN 455  Urban Stormwater Management
CVEN 458  Hydraulic Engineering of Water Distribution Systems
CVEN 462  Engineering Hydrogeology
CVEN 463  Engineering Hydrology
Choose 0-6 Semester Credit Hours From:
CVEN 402  Engineered Environmental Systems
CVEN 403  Applied Civil Engineering Surveying
CVEN 406  Environmental Protection and Public Health
CVEN 413  Natural Environmental Systems
CVEN 423  Geomatics for Civil Engineering
CVEN 454  Urban Planning for Engineers
OCEN 336  Fluid Dynamics Laboratory
OCEN 400  Basic Coastal Engineering

CAPSTONE DESIGN Course (3 Semester Credit Hours Required)
CVEN 400  Design Problems in Civil Engineering

1 CVEN 403 is a 2 semester credit hour course. Students must typically earn an additional 1 semester credit hour of Focus course credit and should consult with their advisors for guidance on appropriate courses with which to earn this credit.

Department of Computer Science & Engineering

Computer Science

The curriculum in computer science is designed to prepare students to enter the rapidly expanding computer field. Curricula and courses are based upon recommendations by the Institute of Electrical and...

Program Mission
The mission of the computer science program at Texas A&M University is to prepare intellectual, professional, and ethical graduates, capable of meeting challenges in the field of Computer Science; and to coordinate with other parts of the university to facilitate the effective use of educational resources by sharing cross-disciplinary courses.

Program Objectives
1. Graduates who choose to enter the workforce will become productive and valuable professionals in their field.
2. Graduates who choose to pursue advanced degrees will be able to gain admission to graduate programs and will become successful graduate students.
3. Graduates will understand the importance of lifelong learning to adapt to new technologies, tools and methodologies with the ability to respond to a changing world.

The four-year undergraduate curriculum in computer science at Texas A&M provides a sound preparation in computing, as well as in science, mathematics, English, and statistics. Students take a broad set of core computer science courses in the first two years, which exposes them to the main concepts in computing. During the last two years, students take elective computer science courses drawn from four tracks (theory, computer systems, software, and information and intelligent systems) to provide both breadth and depth. The electives can be used to tailor the curriculum to match the student’s interests. Graduate courses may be taken by qualified students for some of the electives.

A major in computer science includes a 12-hour area of concentration. This allows students to design a course of study that complements their computer science coursework and takes advantage of opportunities offered by other departments across the University.

The Department of Computer Science and Engineering has significant computer resources of its own, shares resources with other departments and makes use of University systems. Departmental resources for students include modern workstations; large computer servers; disk servers; and massively parallel systems as well as network access to the University supercomputers.

Students must submit a formal degree plan during the first full semester in the department. Departmental advisors are available for assistance.

Computer Engineering
The Computer Engineering curricula provide a balanced view of hardware, software, hardware-software trade-offs, analysis, design, and implementation techniques. It is a dynamic and broadly interdisciplinary field that continues to experience rapid professional growth that impacts every area of human endeavor. The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Program Mission
The mission of the Computer Engineering program is to provide students with an education that ensures an excellent understanding of hardware and software systems and the necessary system design and development skills, and that fosters professional curiosity and imagination that drives them throughout their career.

The program will stimulate and challenge the students with an exceptional, highly motivated faculty that shares its knowledge and excitement about Computer Engineering, well designed undergraduate and graduate curricula, research opportunities at all levels, and a first-class educational infrastructure.

The program strives to produce graduates who are well prepared to excel in industry, academia and government, and who will take on leadership roles in shaping the technological landscape of the future.

Program Objectives
In support of this mission, the Computer Engineering program has defined the following educational objectives:

1. Graduates of the program will have the necessary knowledge, both in breadth and depth, to pursue the practice, or advanced study, of Computer Engineering.
2. Graduates of the program will understand the importance of life-long learning, and be prepared to learn and understand new technological developments in their field.
3. Graduates of the program will understand the technical, social and ethical context of their engineering contributions.
4. Graduates of the program will develop the communication, teamwork, and leadership skills necessary to carry on the legacy of excellence of an Aggie Engineer.

The program periodically evaluates these objectives and assesses the level at which they are met. Input in this ongoing effort is provided by alumni, employers and recruiters, the faculty, and by external advisors to the program. This feedback drives the continuous improvement both of individual courses and of the overall curriculum. For more information on this process contact the Computer Engineering Program website.

Throughout this program, the student works with state-of-the-art computers and laboratory equipment and is exposed to the most recent analytical techniques and technological developments. Significant association with the program’s faculty, who are actively engaged in research and professional consulting activities, serves to acquaint the student with the opportunities and rewards available to the practicing Computer Engineering professional.

Majors
• Bachelor of Science in Computer Engineering, Computer Science Track (p. 384)
• Bachelor of Science in Computer Science (p. 386)

Minors
• Computer Science Minor (p. 387)
• Game Design and Development Minor (p. 388)

Computer Engineering - BS, Computer Science Track
The curriculum is designed to cover the engineering aspects of both hardware and software—a total computer systems perspective. All computer engineering students take courses in the following areas: electrical circuits, electronics, digital circuits, computer architecture
ranging from microcomputers to mainframes, interfacing, programming languages ranging from assembler to high level, data structures, analysis of algorithms, operating systems, software engineering and microcomputer systems. A solid foundation in the basic sciences of physics, chemistry and mathematics is used to support these courses.

There are two distinct tracks in this curriculum, the Electrical Engineering Track and the Computer Science Track, both culminating in the same Computer Engineering degree. The tracks are substantially similar, each providing a broad coverage of the computer engineering discipline, but each has a slightly different emphasis. Note that students in either track can take courses from the other as electives, or they can use their electives to further specialize within their own track. Although students are required to select a track immediately upon entering the Computer Engineering program, it is usually possible to change tracks as late as the junior year.

The Computer Science track of the Computer Engineering degree provides students the freedom to enhance their knowledge in the broad range of topics comprising Computer Engineering: computer networks, computer architecture, artificial intelligence, computer graphics, robotics, real-time computing, computer languages, microcomputers, VLSI, and large-scale hardware and software systems. The track is primarily administered by the Department of Computer Science and Engineering and encompasses nearly all of the core material of the Computer Science degree, but its greater emphasis on design and engineering fundamentals prepares the student for registration as a professional engineer.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

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<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
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<td>CHEM 107</td>
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<td>CHEM 117</td>
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<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<td></td>
<td>University Core Curriculum (p. 21)</td>
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<tr>
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</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Second Year

<table>
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<th>Semester Credit Hours</th>
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<tr>
<td>Fall</td>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts</td>
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<td>CSCE 222/</td>
<td>Discrete Structures for Computing</td>
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<td></td>
<td>ECEN 222</td>
<td></td>
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<td></td>
<td>ECEN 248</td>
<td>Introduction to Digital Systems Design</td>
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<td>MATH 251</td>
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<td></td>
<td>ENGL 210</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<td>COMM 243</td>
<td>Argumentation and Debate</td>
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<tr>
<td>Spring</td>
<td>CSCE 221</td>
<td>Data Structures and Algorithms</td>
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<td>ECEN 214</td>
<td>Electrical Circuit Theory</td>
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<td>MATH 308</td>
<td>Differential Equations</td>
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<td>Semester Credit Hours</td>
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</tbody>
</table>
A major in computer science includes a 12-hour area of concentration. This allows students to design a course of study that complements their computer science coursework and takes advantage of opportunities offered by other departments across the University.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/ CHEM 117 and CHEM 102/CHEM 112, Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

Fall

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>ENGR 111</td>
<td>Foundations of Engineering</td>
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<td>MATH 151</td>
<td>Engineering Mathematics</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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Spring

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<td>ENGR 112</td>
<td>Foundations of Engineering</td>
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</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics</td>
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</tr>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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Total Semester Credit Hours 16

Second Year

Fall

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ENGR 482/ PHIL 482</td>
<td>Ethics and Engineering</td>
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<tr>
<td>Area elective</td>
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<td>Engineering elective</td>
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Spring

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CSCE 315</td>
<td>Programming Studio</td>
<td>3</td>
</tr>
<tr>
<td>CSCE 462</td>
<td>Microcomputer Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 325</td>
<td>Electronics</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 454</td>
<td>Digital Integrated Circuit Design</td>
<td>3</td>
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<td>University Core Curriculum (p. 21)</td>
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Total Semester Credit Hours 15

Third Year

Fall

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CSCE 313</td>
<td>Introduction to Computer Systems</td>
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<tr>
<td>CSCE 350/</td>
<td>Computer Architecture and Design</td>
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<td>ECEN 350</td>
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<td>CSCE 481</td>
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<td>ECEN 314</td>
<td>Signals and Systems</td>
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<td>MATH 311</td>
<td>Topics in Applied Mathematics</td>
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<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>University Core Curriculum (p. 21)</td>
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<tr>
<td>CSCE 399</td>
<td>High-Impact Experience (All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the CSCE advising office.)</td>
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Spring

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<th>Course Code</th>
<th>Course Title</th>
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<tr>
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</tr>
<tr>
<td>CSCE 462</td>
<td>Microcomputer Systems</td>
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</tr>
<tr>
<td>ECEN 325</td>
<td>Electronics</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 454</td>
<td>Digital Integrated Circuit Design</td>
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<tr>
<td>University Core Curriculum (p. 21)</td>
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<tr>
<td>High Impact Experience</td>
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Total Semester Credit Hours 16

Fourth Year

Fall

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<th>Course Code</th>
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<tbody>
<tr>
<td>ENGR 482/ PHIL 482</td>
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<td>Area elective</td>
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<tr>
<td>Engineering elective</td>
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Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CSCE 315</td>
<td>Programming Studio</td>
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<tr>
<td>CSCE 462</td>
<td>Microcomputer Systems</td>
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<td>ECEN 325</td>
<td>Electronics</td>
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<tr>
<td>ECEN 454</td>
<td>Digital Integrated Circuit Design</td>
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</table>

Total Semester Credit Hours 15

Total Semester Credit Hours 95

Total Program Hours 128

Computer Science - BS

The four-year undergraduate curriculum in computer science at Texas A&M provides a sound preparation in computing, as well as in science, mathematics, English, and statistics. Students take a broad set of core computer science courses in the early semesters, which exposes them to the main concepts in computing. During the later semesters, students take elective computer science courses drawn from four tracks (algorithms and theory, computer systems, software, and information and intelligent systems) to provide both breadth and depth. The electives can be used to tailor the curriculum to match the student’s interests. Graduate courses may be taken by qualified students for some of the electives.

Fifteen hours of area electives chosen in consultation with academic advisor.

All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the CSCE advising office and must be approved by student’s advisor.

Three hours of course work to be approved by student’s advisor.

A grade of C or better is required.

Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts</td>
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<td>CSCE 181</td>
<td>Introduction to Computing</td>
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<td>CSCE 222/</td>
<td>Discrete Structures for Computing</td>
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<td>ECEN 222</td>
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<td>MATH 304</td>
<td>Linear Algebra</td>
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<td>COMM 203 Public Speaking</td>
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<td>COMM 205 Communication for Technical Professions</td>
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<td>ENGL 210 Technical and Business Writing</td>
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Semester Credit Hours 17

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<tbody>
<tr>
<td>CSCE 221</td>
<td>Data Structures and Algorithms</td>
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<tr>
<td>CSCE 312</td>
<td>Computer Organization</td>
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<td>CSCE 314</td>
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Semester Credit Hours 17

### Third Year

#### Fall

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<tbody>
<tr>
<td>CSCE 313</td>
<td>Introduction to Computer Systems</td>
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<td>Programming Studio</td>
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<td>CSCE 481</td>
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<td>STAT 211</td>
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Semester Credit Hours 14

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<td>CSCE 411</td>
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<tr>
<td>Computer science elective (p. 768)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Select one from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 251 Engineering Mathematics III</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 302 Discrete Mathematics</td>
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</tr>
<tr>
<td></td>
<td>MATH 308 Differential Equations</td>
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### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>CSCE 482</td>
<td>Senior Capstone Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 482/PHIL 482</td>
<td>Ethics and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Computer science elective (p. 768)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Concentration area elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours 15

### Total Semester Credit Hours 93

1. A grade of C or better is required, including at least two science electives.
2. Science courses must be taken from two areas. See advisor for list of acceptable courses.
3. The concentration area should be chosen only after consultation with a departmental advisor who will help the student arrange a program appropriate to his or her plans following graduation. Students should file a degree plan before taking minor courses to ensure their use in the degree plan.
4. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts, 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences, and American history requirements if they are also on the approved list of international and cultural diversity courses.
5. Computer science electives are to be selected from tracks. See advisor for list of acceptable course choices.
6. All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the CSCE advising office.

### Total Program Hours 126

**Computer Science - Minor**

The Department of Computer Science and Engineering offers a minor in Computer Science.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts</td>
<td>4</td>
</tr>
<tr>
<td>CSCE 221</td>
<td>Data Structures and Algorithms</td>
<td>4</td>
</tr>
</tbody>
</table>
Engineering our graduates embark on an exciting and productive career. The Department of Electrical and Computer Engineering at Texas A&M University offers a Bachelor of Science degree option to its undergraduate students desiring to major in Computer Engineering. A&M University offers a Bachelor of Science degree option to its undergraduate students desiring to major in Computer Engineering.

Almost any technology that distinguishes the 20th and 21st centuries from previous history has the imprint of electrical and computer engineering - electric power, radio, television, radar, satellite communication, global positioning system, medical diagnostic and procedure systems, sophisticated domestic appliances, cell phones, computers and sophisticated sensors and control systems used in underwater, space exploration and national security. Electrical and computer engineering has advanced national and global prosperity through research, development and application of electrical and computer technologies and sciences for the benefit of humanity, and has helped create the global village. By choosing electrical or computer engineering our graduates embark on an exciting and productive career with endless opportunities and help in shaping a better future for mankind.

The curriculum is designed to prepare the undergraduate for work in the highly diverse electrical and computer engineering profession. A solid foundation in physics, chemistry and mathematics is used to support courses in the fundamentals of electrical and computer engineering. The use of computers is integrated throughout the curriculum, and basic studies in circuits, electronics, electromagnetic fields and digital logic lead to a flexible program of electives in the junior and senior year. Electives may be chosen from the broad fields of analog and mixed-signal electronics, biomedical imaging, sensing and genomic signal processing, computer engineering and systems, device science and nanotechnology, electric power systems and power electronics, electromagnetics and microwaves, and information science and systems. Laboratory work is structured to first familiarize the student with the basic concepts and then to apply these concepts to solve engineering problems.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Mission**

Activities of the Electrical and Computer Engineering Department including research, teaching, and professional and community service revolve around the fourfold mission of the department:

- To create new knowledge and challenge young minds by participation in the process of discovery and invention
- To educate electrical and computer engineers with a solid background of fundamentals, stretching their imagination
- To prepare graduates for an exciting future
- To serve the society through research, education and outreach activities

Undergraduate education plays a major part in helping the department to achieve its mission. The Electrical and Computer Engineering programs are accredited by the Engineering Accreditation Commission of ABET, www.abet.org. More information on these efforts can be found at the Department of Electrical and Computer Engineering (http://engineering.tamu.edu/electrical) website by clicking on the link for ABET Accreditation.

**Game Design and Development - Minor**

The Department of Computer Science and Engineering offers a Minor in Game Design and Development. This is offered in cooperation with the Department of Visualization. Enrollment in the minor is managed through the Department of Visualization.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 110</td>
<td>Programming I and Introduction to Computer Science Concepts and Programming</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CSCE 111</td>
<td>or Introduction to Program Design and Concepts</td>
<td></td>
</tr>
<tr>
<td>CSCE 441</td>
<td>Computer Graphics or Introduction to Game Design</td>
<td>3</td>
</tr>
<tr>
<td>VIST 486</td>
<td>or Introduction to Game Design</td>
<td></td>
</tr>
<tr>
<td>CSCE 443/ VIST 487</td>
<td>Game Development</td>
<td>3</td>
</tr>
<tr>
<td>Select two from:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>COMM 230/Communication Technology Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JOUR 230</td>
<td>Communication and Video Games</td>
<td></td>
</tr>
<tr>
<td>COMM 453</td>
<td>Computer-Human Interaction</td>
<td></td>
</tr>
<tr>
<td>CSCE 436</td>
<td>Interactive Virtual Environments</td>
<td></td>
</tr>
<tr>
<td>VIST 370</td>
<td>Multimedia Design and Development</td>
<td></td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours 16**

**Department of Electrical & Computer Engineering**

Almost any technology that distinguishes the 20th and 21st centuries from previous history has the imprint of electrical and computer engineering - electric power, radio, television, radar, satellite communication, global positioning system, medical diagnostic and procedure systems, sophisticated domestic appliances, cell phones, computers and sophisticated sensors and control systems used in underwater, space exploration and national security. Electrical and computer engineering has advanced national and global prosperity through research, development and application of electrical and computer technologies and sciences for the benefit of humanity, and has helped create the global village. By choosing electrical or computer engineering our graduates embark on an exciting and productive career with endless opportunities and help in shaping a better future for mankind.

The curriculum is designed to cover the engineering aspects of both hardware and software—a total computer systems perspective. All computer engineering students take courses in the following areas:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 222/ ECEN 222</td>
<td>Discrete Structures for Computing</td>
</tr>
<tr>
<td>CSCE 312</td>
<td>Computer Organization</td>
</tr>
<tr>
<td>CSCE 313</td>
<td>Introduction to Computer Systems</td>
</tr>
<tr>
<td>or CSCE 314</td>
<td>or Programming Languages</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours 18**

Students must make a grade of "C" or better in all courses.

Completion of all minor coursework with GPA of 2.75 or better required.
electrical circuits, electronics, digital circuits, computer architecture ranging from microcomputers to mainframes, interfacing, programming languages ranging from assembler to high level, data structures, analysis of algorithms, operating systems, software engineering and microcomputer systems. A solid foundation in the basic sciences of physics, chemistry and mathematics is used to support these courses.

There are two distinct tracks in this curriculum, the Electrical Engineering Track and the Computer Science Track, both culminating in the same Computer Engineering degree. The tracks are substantially similar, each providing a broad coverage of the computer engineering discipline, but each has a slightly different emphasis. Note that students in either track can take courses from the other as electives, or they can use their electives to further specialize within their own track. Although students are required to select a track immediately upon entering the Computer Engineering program, it is usually possible to change tracks as late as the junior year.

The Electrical Engineering track of the Computer Engineering degree places stronger emphasis on digital Very Large Scale Integrated (VLSI) circuits and systems, microprocessor interfacing and system design, computer system architecture, hardware-software interaction and embedded systems. The track is primarily administered by the Department of Electrical and Computer Engineering and is designed to encompass nearly all of the core material of the Electrical Engineering degree, but provides much more depth in computing. Students studying Computer Engineering can readily apply their knowledge to the design of digital circuits and software in various areas, including cell phones, computers, computer networks, computer vision, pattern recognition and embedded systems.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/ CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics</td>
<td>4</td>
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</tbody>
</table>

First Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>1</td>
</tr>
<tr>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts</td>
<td>4</td>
</tr>
<tr>
<td>CSCE 222/ECEN 222</td>
<td>Discrete Structures for Computing</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 248</td>
<td>Introduction to Digital Systems Design</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
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</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 221</td>
<td>Data Structures and Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 214</td>
<td>Electrical Circuit Theory</td>
<td>4</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ENG 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
</tbody>
</table>
Advanced satellite systems. Many electrical engineers also work in areas closely related to computers. Areas of specialization include analog and mixed-signal electronics; biomedical imaging, sensing and genomic signal processing; computer engineering and systems; device science and nanotechnology; electric power systems and power electronics; electromagnetics and microwaves; and information science and systems.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

**Total Program Hours 128**

**Electrical Engineering - BS**

The Department of Electrical and Computer Engineering at Texas A&M University offers a Bachelor of Science degree option to its undergraduate students desiring to major in Electrical Engineering.

Electrical engineers design, develop, test and supervise the manufacture of sophisticated electrical and electronic systems such as: cell phones, iPods, digital TVs, medical imaging, smart appliances, automobiles and advanced satellite systems. Many electrical engineers also work in areas such as: cell phones, iPods, digital TVs, medical imaging, smart appliances, automobiles and advanced satellite systems. Many electrical engineers also work in areas

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5 Students intending to specialize in Communications are encouraged to take ECEN 303.

6 Fulfills the University Core Curriculum requirement for Language, Philosophy and Culture.

7 See advising office for a listing of approved electives.

8 All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the ECEN advising office.
Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts ¹</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 248</td>
<td>Introduction to Digital Systems Design ¹</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) ³</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 214</td>
<td>Electrical Circuit Theory ¹</td>
<td>4</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations ¹</td>
<td>3</td>
</tr>
<tr>
<td>MATH 311</td>
<td>Topics in Applied Mathematics I ¹</td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21) ³</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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<td>16</td>
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### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 314</td>
<td>Signals and Systems ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 322</td>
<td>Electric and Magnetic Fields ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 325</td>
<td>Electronics ¹</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 222</td>
<td>Modern Physics for Engineers ¹</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>16</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 303</td>
<td>Random Signals and Systems ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 350/</td>
<td>Computer Architecture and Design ¹</td>
<td>4</td>
</tr>
<tr>
<td>CSCE 350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECEN 370</td>
<td>Electronic Properties of Materials ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECEN elective (p. 781) ⁵</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Technical elective ⁵</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>High Impact Experience ⁷</td>
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</tr>
<tr>
<td>ECEN 399</td>
<td>High Impact Professional Development</td>
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<tr>
<td>Total Semester Credit Hours</td>
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</table>

### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 403</td>
<td>Electrical Design Laboratory I ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECEN elective (p. 781) ⁵</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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<td>15</td>
</tr>
</tbody>
</table>

#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 404</td>
<td>Electrical Design Laboratory II ¹</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 482/</td>
<td>Ethics and Engineering ⁶</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 482</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECEN elective (p. 781) ⁵</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours: 95

### Total Program Hours 128

#### Electrical Engineering - Minor

The Department of Electrical and Computer Engineering offers a minor in Electrical Engineering. Students interested in the Electrical Engineering minor should contact the undergraduate advising office of the Electrical and Computer Engineering Department for further information.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 214</td>
<td>Electrical Circuit Theory ¹</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 248</td>
<td>Introduction to Digital Systems Design</td>
<td>4</td>
</tr>
<tr>
<td>ECEN 314</td>
<td>Signals and Systems ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECEN 325</td>
<td>Electronics ¹</td>
<td>4</td>
</tr>
<tr>
<td>ECEN Elective (p. 781) ¹</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

¹ Select course from ECEN 300-499 (p. 781) except ECEN 314, ECEN 325, ECEN 405, and ECEN 485.

Students must make a grade of "C" or better in all courses.

Further Requirements: A minimum grade point average of 2.75 is required for entering the minor. Prerequisite coursework includes the calculus sequence, MATH 308, and PHYS 208 or equivalents. Students majoring in Computer Engineering will not be permitted to minor in Electrical Engineering since the coursework prescribed for the minor is required coursework for the Computer Engineering degree.
Department of Engineering Technology and Industrial Distribution

The Department of Engineering Technology and Industrial Distribution offers four baccalaureate degree programs in electronics systems engineering technology, industrial distribution, manufacturing and mechanical engineering technology, and multidisciplinary engineering technology. While these degrees are distinct, they share several common features including a sound foundation of mathematics and basic sciences, a strong core of technical courses, and an emphasis on written and oral communications. The curricula emphasize the latest state-of-the-art technologies, innovation and entrepreneurship. Finally, all four degrees are designed to prepare students for careers in industry with strong opportunities for advancement. Because these programs are highly applied and have a focus on project-based learning and experiential education, most of the department’s courses have hands-on laboratories that allow students to put theory to practice.

The mission of the Department of Engineering Technology and Industrial Distribution is to:

- maintain nationally recognized programs in engineering technology and industrial distribution
- focus on educating highly-qualified students with hands-on skills, providing them with experiences in advanced integration of both conventional and emerging technologies, a unique understanding of management and business practices, and an entrepreneurial point of view
- provide leadership within the COE and university in interdisciplinary applied research, to include the development and deployment of new technology
- promote and develop long term partnerships with industry and government that foster enhancements and interactions in education, research, and professional development

Electronic Systems Engineering Technology (ESET)

Electronic Systems Engineering Technology (ESET) prepares students for careers in electronic product and system development across a diverse range of industries that include the medical, power, computer networking, automotive, telecommunications, and quality of life sectors.

The Electronic Systems Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org. For more information about the Electronic Systems Engineering Technology (ESET) program including the mission and program educational objectives, please see the program requirements (p. 394).

Graduates are awarded the Bachelor of Science in Electronic Systems Engineering Technology.

Industrial Distribution (IDIS)

Industrial distribution prepares men and women for sales engineering, sales management and mid-management positions with manufacturers who sell through distributors and with wholesale distributors who purchase, warehouse, sell, distribute and service a wide variety of industrial products. Industry segments include: automation solutions; general line; building materials; chemical and petrochemical; electrical; electronics; semiconductor; fluid power; heating, ventilation and air conditioning; mechanical power; metals; plastics; plumbing; safety equipment; specialty tools; and welding; oil & gas; defense; material handling; healthcare; automotive; heavy equipment; packaging; and logistics. The day-to-day challenges faced by the industrial distributor or the manufacturer’s representative require the person to be a professional with many capabilities. For more information about the Industrial Distribution (IDIS) program, please see the program requirements (p. 394).

Manufacturing and Mechanical Engineering Technology (MMET)

Manufacturing and mechanical engineering technology (MMET) prepares students for dynamic careers in industry. Graduates are versatile and effective in diverse areas that require understanding of the dependencies among material properties, product design, costs, manufacturing systems, and process technologies.

The Manufacturing and Mechanical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org. For more information about the Manufacturing and Mechanical Engineering Technology (MMET) program including the mission and program educational objectives, please see the program requirements (p. 396).

Graduates are awarded the Bachelor of Science in Manufacturing and Mechanical Engineering Technology.

Multidisciplinary Engineering Technology (MXET)

Multidisciplinary Engineering Technology combines core concepts from the electronics and mechanical engineering technology disciplines and provides students with a strong background in embedded systems, electronic system design, instrumentation, controls, statics, dynamics, thermodynamics, mechanical system design, and project management.

The curriculum is then augmented through a 29-hour technical focus area. The Mechatronics focus area is currently available and additional focus areas will be identified and created.

For more information about the Multidisciplinary Engineering Technology (ESET) program including the mission and program educational objectives, please see the program requirements (p. 398).

Graduates are awarded the Bachelor of Science in Multidisciplinary Engineering Technology.

Department Academic Policies

The Department of Engineering Technology and Industrial Distribution (ETID) imposes academic requirements in addition to those imposed by the University (Texas A&M University Student Rules) and college. For complete details concerning these and other academic policies, students should contact the ETID Undergraduate Advising Office and are referred to the ETID (http://engineering.tamu.edu/etid) website.

A student must complete all prerequisites for a course with a grade of C or better by the start of the semester in which the student plans to enroll in the course. A student is responsible for checking the prerequisites for each course to ensure the prerequisite requirements have been satisfied. A student who registers for a course for which he/she lacks the necessary prerequisite course(s) and/or the prerequisite grade requirement will be required to drop the course. A student who is told to drop a course and is still enrolled by the deadline set each semester...
may be administratively dropped by the department. If a student is administratively dropped from a course, the student is responsible for all financial obligations associated with the drop. An administrative drop may adversely impact (including, but not limited to): health insurance benefits, financial aid, athletic eligibility, INS status, veterans’ benefits, and eligibility to participate in extracurricular activities.

The department encourages students to participate in industrial internships or the Cooperative Education Program to acquire practical experience to complement their engineering technology education.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Majors**

- Bachelor of Science in Electronic Systems Engineering Technology (p. 393)
- Bachelor of Science in Industrial Distribution (p. 394)
- Bachelor of Science in Manufacturing and Mechanical Engineering Technology (p. 396)
- Bachelor of Science in Multidisciplinary Engineering Technology (p. 398)

**Minors**

- Embedded Systems Integration Minor (p. 399)

**Masters**

- Master of Industrial Distribution in Industrial Distribution (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/engineering/technology-industrial-distribution/mid)

**Electronic Systems Engineering Technology - BS**

Electronic Systems Engineering Technology (ESET) prepares students for careers in electronic product and system development across a diverse range of industries that include the medical, power, computer networking, automotive, telecommunications, and quality of life sectors. While graduates of the program receive a rigorous technical education and typically take engineering and technology positions within industry, they are also well prepared for positions in technical sales and project management. The ESET curriculum is based on a strong underpinning of engineering math and science courses followed by a core technical sequence. This core includes analog and digital electronics, embedded systems design, real-time software development using C and assembly language, wired/wireless data communications, instrumentation and control. Throughout their curriculum, students work on multiple open-ended projects to design, implement, test, and evaluate hardware and software systems. One of the most unique aspects of the Electronic Systems Engineering Technology program is that almost every technical curriculum is augmented with coursework in written and oral communications, product/system development, device/system testing and technical project management. A team-based industry-sponsored capstone design sequence provides a challenging opportunity to apply technical, managerial, and communications skills to solving a real-world problem.

The Electronic Systems Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org/.

**ESET Program Mission**

The Electronic Systems Engineering Technology Program at Texas A&M University prepares graduates for immediate impact and long-term career success by providing a real-world experiential education coupled with personalized undergraduate experiences in electronics product development, test, system integration, and engineering research.

**ESET Program Educational Objectives**

The Electronic Systems Engineering Technology Program at Texas A&M has as its primary educational objectives to produce graduates who, after three to five years:

- possess the technical skills to be highly productive and have successful careers in regional, state or national electronic product and system development industries
- demonstrate increasing levels of leadership and responsibility during their careers
- exhibit a commitment to professional ethics in their careers
- display a desire for life-long learning through continued education, technical training, and/or professional development

A continuous cycle of assessment and program improvement is used to ensure that these objectives are being met. Through interactions with industry and academic partners, the Electronic Systems Engineering Technology program continues to offer a state-of-the-art curriculum that produces successful graduates.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

**First Year**

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric ¹</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111 Foundations of Engineering ¹</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151 Engineering Mathematics ¹ ²</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218 Mechanics ¹</td>
<td>4</td>
</tr>
<tr>
<td>Semester</td>
<td>Course Code</td>
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</tr>
<tr>
<td>Fall</td>
<td>ESET 350</td>
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<tr>
<td></td>
<td>ESET 355</td>
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<tr>
<td></td>
<td>ESET 369</td>
</tr>
<tr>
<td>Spring</td>
<td>ESET 352</td>
</tr>
<tr>
<td></td>
<td>ESET 359</td>
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<tr>
<td></td>
<td>ESET 455</td>
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<td></td>
<td>ENTC 399</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
</tr>
<tr>
<td>Fourth Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>ESET 419</td>
</tr>
<tr>
<td></td>
<td>ESET 462</td>
</tr>
<tr>
<td></td>
<td>ENGR 482</td>
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<td>PHIL 482</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
</tr>
<tr>
<td></td>
<td>Technical elective</td>
</tr>
<tr>
<td>Spring</td>
<td>ESET 420</td>
</tr>
<tr>
<td></td>
<td>ENGR 482/</td>
</tr>
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<td>PHIL 482</td>
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<td>University Core Curriculum (p. 21)</td>
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<td>Technical elective</td>
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<td></td>
<td>Total Semester Credit Hours</td>
</tr>
<tr>
<td></td>
<td>Total Program Hours</td>
</tr>
</tbody>
</table>

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4. BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/ CHEM 111 or CHEM 107/ CHEM 117 and CHEM 102/ CHEM 112; Credit by Examination (CBE) for CHEM 101/ CHEM 111 or CHEM 107/ CHEM 117 plus CHEM 102/ CHEM 112; or 8 hours of CBE for CHEM 101/ CHEM 111 or CHEM 107/ CHEM 112.

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ESET 210</td>
<td>Circuit Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ESET 219</td>
<td>Digital Electronics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ESET 269</td>
<td>Embedded Systems Development in C</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics (p. 22)</td>
<td>3</td>
<td></td>
</tr>
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<td>University Core Curriculum (p. 21)</td>
<td>3</td>
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</tr>
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<td>Total Semester Credit Hours</td>
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</tr>
<tr>
<td>Spring</td>
<td>ESET 211</td>
<td>Power Systems and Circuit Applications</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ESET 315</td>
<td>Local-and-Metropolitan-Area Networks</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ESET 329</td>
<td>Six Sigma and Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ESET 349</td>
<td>Microcontroller Architecture</td>
<td>4</td>
</tr>
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<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
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<td>Total Semester Credit Hours</td>
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</tr>
<tr>
<td>Third Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>ESET 319</td>
<td>Engineering Leadership</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ESET 333</td>
<td>Product Development</td>
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Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ESET 455</td>
<td>Wireless Transmission Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENTC 399</td>
<td>High Impact Experience</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ESET 419</td>
<td>Engineering Technology Capstone</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ESET 462</td>
<td>Control Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 482</td>
<td>Ethics and Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHIL 482</td>
<td>Ethics and Philosophy</td>
<td>3</td>
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<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Total Program Hours 127

Industrial Distribution - BS

Industrial distribution prepares men and women for sales engineering, technical sales, supply chain management, operations management, sales management and other managerial positions. Students are prepared for employment in industry segments that include: aerospace; automation solutions; building materials; chemical and petrochemical; electrical; electronics; information systems and technology; healthcare; fluid power; general line; heating, ventilation and air conditioning;
management consulting; mechanical power; metals; oil and gas; plastics; pipe, valve, and fitting; plumbing; safety equipment; semiconductor; specialty tools; and welding. The day-to-day challenges faced by the industrial distributor or the manufacturer’s representative require the person to be a professional with many capabilities. To fulfill this demand, the curriculum provides study in business, communications, finance, information technology, applied technology, general management, engineering, ethics, and human relations. This knowledge is applicable to the graduate in relationships with executives, managers, engineers, scientists, and business analysts while taking leadership roles in their manufacturing, distribution, analysis, service, production planning and maintenance or construction operations. The industrial distribution graduate assists these preceding entities by direct application of operations, business, and product knowledge. Essentially the industrial distribution graduate becomes a consultative resource to businesses - a challenging and rewarding career that can lead to the possibility of becoming a business leader in multiple segments. Graduates receive the Bachelor of Science degree in Industrial Distribution.

Mission
Industrial Distribution prepares students for sales engineering, sales management, supply chain operations and logistics management mid-management positions with wholesale distributors, who purchase, warehouse, sell, distribute and service a wide variety of products, and with manufacturers who sell through distributors.

Program Educational Objectives
The Industrial Distribution Program at Texas A&M has as its primary educational objectives to produce graduates who:

- Possess the technical skills to be immediately productive and have successful careers in regional, state or national level industrial distribution firms (or related firms across the multiple industry verticals).
- Demonstrate increasing levels of leadership and responsibility during their careers.
- Exhibit a commitment to professional ethics in their professional career.
- Display a desire for life-long learning through continued education, technical training, and/or professional development.

Program Requirements
The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111 Foundations of Engineering</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151 Engineering Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218 Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>CHEM 107 General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 117 General Chemistry for Engineering Students Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 112 Foundations of Engineering II</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152 Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208 Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
<td>17</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td>33</td>
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</tbody>
</table>

1. A grade of C or better is required.
2. Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3. Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4. BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>IDIS 240 Introduction to Industrial Distribution</td>
<td>3</td>
</tr>
<tr>
<td>MMET 201 Manufacturing and Materials</td>
<td>4</td>
</tr>
<tr>
<td>STAT 201 Elementary Statistical Inference or STAT 303 or Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td>Semester Credit Hours</td>
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<tr>
<td>Semester</td>
<td>Course Title</td>
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<tr>
<td><strong>Spring</strong></td>
<td>ACCT 209 Survey of Accounting Principles</td>
</tr>
<tr>
<td></td>
<td>ECON 202 Principles of Economics</td>
</tr>
<tr>
<td></td>
<td>ISTM 209 Business Information Systems Concepts</td>
</tr>
<tr>
<td></td>
<td>MGMT 209 Business, Government and Society</td>
</tr>
<tr>
<td></td>
<td>or MGMT 212 or Business Law</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
</tr>
<tr>
<td><strong>Third Year</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td>ENGL 210 Technical and Business Writing</td>
</tr>
<tr>
<td></td>
<td>IDIS 330 Sales Engineering</td>
</tr>
<tr>
<td></td>
<td>IDIS 340 Manufacturer Distributor Relations</td>
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<tr>
<td></td>
<td>IDIS 343 Distribution Logistics</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>IDIS 300 Industrial Electricity</td>
</tr>
<tr>
<td></td>
<td>IDIS 303 Mechanical Power Transmission</td>
</tr>
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<td></td>
<td>IDIS 344 Distributor Information and Control</td>
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<td></td>
<td>Systems</td>
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<td>ENTC 399 High Impact Experience</td>
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<td>Technical elective</td>
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<td></td>
<td>Directed elective</td>
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<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td><strong>Fourth Year</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td>IDIS 400 Industrial Automation</td>
</tr>
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<td></td>
<td>IDIS 403 Fluid Power Transmission</td>
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<td></td>
<td>IDIS 424 Purchasing Applications in Distribution</td>
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<td></td>
<td>IDIS 433 Industrial Sales Force Development</td>
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<td></td>
<td>IDIS 464 Distributor Operations and Financial</td>
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<tr>
<td></td>
<td>Management</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>IDIS 434 The Quality Process in Distribution</td>
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<td></td>
<td>IDIS 444 Ethics and Leadership in Distribution</td>
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<td></td>
<td>IDIS 450 Analytics for Distribution Operation</td>
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<td>Directed elective</td>
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<td></td>
<td>University Core Curriculum (p. 21)</td>
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<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
</tr>
</tbody>
</table>

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5 Students in Industrial Distribution satisfy the 3 hour social and behavioral sciences by taking ECON 202 as a required course. Instead, IDIS students must take a 3 hour course from the Language, Philosophy, and Culture list. They may also use this course to satisfy one of their ICD courses.

6 See a departmental advisor for a list of acceptable directed electives and technical electives.

7 Completion of ENGL 104, MATH 151, MATH 152, CHEM 107/117, and PHYS 218 with a C or better required.

8 All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the ETID advising office.

The curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

**Total Program Hours 126**

**Manufacturing and Mechanical Engineering Technology - BS**

Manufacturing and mechanical engineering technology (MMET) prepares students for dynamic careers in industry. Graduates are versatile and effective in diverse areas that require understanding of the dependencies among material properties, product design, costs, manufacturing systems, and process technologies. The student views manufacturing from an enterprise and system perspective, recognizing the importance of customer and supplier interactions. To meet these diverse needs, this degree program provides a foundation of mathematics, science, and specialized technical courses, as well as preparation in oral and written communication. The three main areas of concentration are product design, manufacturing systems integration and automation, and quality assessment. Studies in these areas are supported by a solid foundation in materials and manufacturing processes.

The Manufacturing and Mechanical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, http://www.abet.org/.

**Program Mission**

The mission of the Manufacturing and Mechanical Engineering Technology program at Texas A&M University is to provide a high-quality, application-oriented education producing professionals who can effectively contribute to leadership, the advancement of manufacturing and mechanical engineering technology, and improved performance of industrial endeavors. The educational mission is complemented by applied research and the development of new interdisciplinary technology that mutually benefits the university and its industrial, governmental, and academic collaborators. The people in the program are committed to providing service and leadership in the promotion and advancement of the University and the profession.

**Program Educational Objectives**

The MMET program prepares students who after a few years after graduation:

- Demonstrate manufacturing and mechanical technical knowledge, problem solving skills, and implementation skills for careers in design, installation, operations, technical sales, or service functions in industry;
- Demonstrate increasing level of leadership and responsibility;
- Exhibit both immediate and sustainable productivity in a dynamic work environment.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical
engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/ CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

### First Year

<table>
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<th>Course</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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### Second Year

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<td>MMET 181</td>
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<td>COMM 205</td>
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<td>Technical and Business Writing</td>
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<td>Nonmetallic Materials</td>
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<td>STAT 211</td>
<td>Principles of Statistics I</td>
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<td>MMET 207</td>
<td>Metallic Materials</td>
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<td>MMET 275</td>
<td>Mechanics for Technologists</td>
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<td>MMET 281</td>
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<td>ISEN 302</td>
<td>Economic Analysis of Engineering Projects</td>
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### Third Year

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<td>IDIS 300</td>
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<td>MMET 303</td>
<td>Fluid Mechanics and Power</td>
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<td>MMET 376</td>
<td>Strength of Materials</td>
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<td>MMET 380</td>
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<td>MMET 320</td>
<td>Quality Assurance</td>
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<td>MMET 361</td>
<td>Product Design and Solid Modeling</td>
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<td>MMET 363</td>
<td>Mechanical Design Applications</td>
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<tr>
<td></td>
<td>MMET 383</td>
<td>Manufacturing Information Systems</td>
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### Fourth Year

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<td>Thermodynamics for Technologists</td>
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<td></td>
<td>MMET 402</td>
<td>Inspection Methods and Procedures</td>
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<td>MMET 410</td>
<td>Manufacturing Automation and Robotics</td>
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<td></td>
<td>MMET 429</td>
<td>Managing People and Projects in a Technological Society</td>
<td>1,6</td>
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<tr>
<td></td>
<td>MMET 463</td>
<td>Mechanical Design Applications II</td>
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<td>MMET 412</td>
<td>Production and Inventory Planning</td>
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<td>MMET 422</td>
<td>Manufacturing Technology Projects</td>
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</tr>
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</table>
The program educational objectives of the BS MXET degree program are to produce graduates who, within two to five years after graduation, will:

- Possess and demonstrate technical knowledge of the design, manufacture, sales, and service of complex systems that span multiple engineering technology disciplines.
- Demonstrate increasing level of leadership and responsibility.
- Exhibit productivity in a dynamic work environment through a commitment to lifelong learning.
- Exhibit a commitment to professional ethics in their professional career.

A continuous cycle of assessment and program improvement is used to ensure that these objectives are being met. Through interactions with industry and academic partners, the Multidisciplinary Engineering Technology program offers a state-of-the-art curriculum that produces successful graduates.

MXET Focus Areas

As discussed above, the MXET degree supports a 29-hour focus area allowing the student to apply their technical knowledge to specific areas of interest. Currently, the degree supports a focus in Mechatronics preparing students to design, develop and support products and systems that combine mechanical, electronic, communication, control, and embedded computing principles.

Additional MXET focus areas are currently being identified and will be available in the future.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering.

The freshman year is slightly different for chemical engineering in that students take CHEM 101/111 or CHEM 107/117 and CHEM 102/112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/111 or CHEM 107/117 and CHEM 102/112.

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<table>
<thead>
<tr>
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<th>Fall Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric 1</td>
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<td>ENGR 111</td>
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<td>MATH 151</td>
<td>Engineering Mathematics 112</td>
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<td>PHYS 218</td>
<td>Mechanics 1</td>
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### Spring

<table>
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<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHEM 107</td>
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<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<td>ENGR 112</td>
<td>Foundations of Engineering 1</td>
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</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<tr>
<td>University Core Curriculum (p. 21)</td>
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<td>3</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ESET 210</td>
<td>Circuit Analysis 1</td>
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<td>ESET 219</td>
<td>Digital Electronics 1</td>
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<td>MMET 207</td>
<td>Metallic Materials 1</td>
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<td>MMET 275</td>
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<td>Mathematics Elective 1,5</td>
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#### Spring

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<th>Course</th>
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<tr>
<td>ESET 269</td>
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<td>ESET 350</td>
<td>Analog Electronics 1</td>
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<td>MMET 303</td>
<td>Fluid Mechanics and Power 1,6</td>
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### Third Year

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<tr>
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<td>MMET 361</td>
<td>Product Design and Solid Modeling 1,6</td>
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<td>MMET 370</td>
<td>Thermodynamics for Technologists 1</td>
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<td>MMET 375</td>
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### Select one:

- ENGL 210 Technical and Business Writing 3
- COMM 203 Public Speaking
- COMM 205 Communication for Technical Professions 17

#### Spring

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<td>Electronic Instrumentation 1</td>
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<td>ESET 369</td>
<td>Embedded Systems Software 1,6</td>
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<td>MMET 363</td>
<td>Mechanical Design Applications 1</td>
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<tr>
<td>MXET 300</td>
<td>Mechatronics I – Mobile Robotic Systems 1,6</td>
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### High Impact Experience 7

- ENTC 399 High Impact Experience 0
- University Core Curriculum (p. 21) 3

### Fourth Year

#### Fall

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<td>ESET 420</td>
<td>Engineering Technology Capstone II 1</td>
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### Fourth Year

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</table>

- ESET 420 Engineering Technology Capstone II 1
- or MMET 422 Manufacturing Technology Projects
- University Core Curriculum (p. 21) 3

| Technical Elective 1,5 | | 2 |

#### Total Semester Credit Hours

94

5 See a departmental advisor for a list of approved electives.
6 Meets the 29 hr Mechatronics focus area requirements.
7 All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the ETID advising office.
8 This is a new course, see a departmental advisor for the correct course number.

This curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

### Total Program Hours 127

#### Embedded Systems Integration - Minor

Our cars, cell phones, even every-day appliances operate based on small “computers” that sense the environment, make decisions, and control operations; essentially making our devices “smart.” These “computers” or embedded processors/microcontrollers are a fundamental component in most modern products and systems and are used across a wide range...
of industries that include medical, oil/gas, process control, automotive, communications, and quality of life.

The Embedded Systems Integration minor offered by the Department of Engineering Technology and Industrial Distribution teaches students about embedded systems hardware and software development and how these systems are used in modern products. The minor requires five courses (18 hours) and is available to not only engineering students but also students outside the College of Engineering who are interested in studying technology and understanding the devices that power our lives.

Students interested in an Embedded Systems Integration minor should see an advisor in Engineering Technology and Industrial Distribution for more information.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ESET 219</td>
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<td>Embedded Systems Development in C</td>
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</tr>
<tr>
<td>ESET 333</td>
<td>Product Development</td>
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</tr>
<tr>
<td>ESET 349</td>
<td>Microcontroller Architecture</td>
<td>4</td>
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<tr>
<td>ESET 369</td>
<td>Embedded Systems Software</td>
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<tr>
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Students must make a grade of "C" or better in all courses.

**Department of Industrial and Systems Engineering**

Industrial engineering is an engineering discipline devoted to the design, installation, improvement and control of integrated systems of people, materials, and facilities in a wide range of organizations that produce goods or render services. Like other engineering fields, industrial engineering is concerned with solving problems through the application of specialized knowledge in mathematics and science, as well as the principles of engineering. An important characteristic of industrial engineering is its systems approach to integrate the basic resources of production and service systems and other relevant resources, such as information and energy, in such a way as to create a smooth, efficient and competitive operation within an enterprise. Industrial and systems engineers are needed in virtually all types of enterprises, ranging from industries such as manufacturing, distribution, logistics, transportation, and construction; service sectors such as health care, telecommunications, retail, banking, and engineering consulting to government agencies, military, and non-profit organizations.

The mission of the Industrial Engineering program is to serve the state, nation, and global community by educating industrial engineering students to be well founded in engineering fundamentals and to have the knowledge and skills required to design, develop, improve, implement and control sophisticated production and service systems in an environment characterized by complex technical and social challenges. Throughout this educational process, students will be instilled with the highest standards of professional and ethical behavior. It is the intent of the undergraduate industrial engineering program to equip its graduates to achieve the following accomplishments a few years after graduation:

1. Graduates will be successful in improving operations by solving complex industrial engineering problems.
2. Graduates will demonstrate professional leadership.
3. Graduates will be instilled with the motivation and ability to accomplish professional life-long learning.

The undergraduate program in Industrial Engineering at Texas A&M University is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Industrial Engineering students may participate in the Undergraduate Minor Program offered by Texas A&M. This program is usually comprised of 15 to 18 hours, some of which may be substituted as technical electives. The most common minors are math, business and economics. The department also has a Fast Track Program for academically qualified students who want to take selected graduate courses and receive both graduate and undergraduate credit by meeting specific requirements. The department encourages students to participate in industrial internships or the Cooperative Education Program to acquire practical experience to complement their industrial engineering education. Internships are generally encouraged during the summer months only. Students who participate in the Co-op program during three academic semesters may count the three credit hours as a technical elective in their curriculum.

Graduate degrees including the Master of Science (MS), Master of Engineering (M.Eng.), and Doctor of Philosophy (PhD) are also offered by the department in addition to the Bachelor of Science in Industrial Engineering. For graduate degree information, please see the Texas A&M University Graduate Catalog.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Faculty**

Banerjee, Amarnath P, Professor
Industrial & Systems Eng
PHD, University of Illinois at Chicago, 1999

Bennett, George K, Senior Professor
Industrial & Systems Eng
PHD, Texas Tech University, 1970

Bukkapatnam, Satish T, Professor
Industrial & Systems Eng
PHD, The Pennsylvania State University, 1997

Butenko, Sergiy, Professor
Industrial & Systems Eng
PHD, University of Florida, 2003

Curry, Guy L, Senior Professor
Industrial & Systems Eng
PHD, University of Arkansas, 1971

Ding, Yu, Professor
Industrial & Systems Eng
PHD, University of Michigan, 2001

Elwany, Alaa Mohamed H, Assistant Professor
Industrial & Systems Eng
PHD, Georgia Institute of Technology, 2009
Erraguntla, Madhav, Associate Professor of the Practice
Industrial & Systems Eng
PHD, Texas A&M University, 1996

Feldman, Richard M, Senior Professor
Industrial & Systems Eng
PHD, Northwestern University, 1975

Ferris, Thomas K, Associate Professor
Industrial & Systems Eng
PHD, University of Michigan, 2010

Gautam, Natarajan, Professor
Industrial & Systems Eng
PHD, University of North Carolina at Chapel Hill, 1997

Graul, Michael H, Associate Professor of the Practice
Industrial & Systems Eng
PHD, Texas A&M University, 1995

Johnson, Andrew L, Associate Professor
Industrial & Systems Eng
PHD, Georgia Institute of Technology, 2006

Kianfar, Kiavash, Associate Professor
Industrial & Systems Eng
PHD, North Carolina State University, 2007

Mayer, Richard J, Adjunct Professor
Industrial & Systems Eng
PHD, Texas A&M University, 1998

Moreno Centeno, Erick, Associate Professor
Industrial & Systems Eng
PHD, University of California, Berkeley, 2010

Majors

• Bachelor of Science in Industrial Engineering (p. 401)

Minors

• Industrial Engineering Minor (p. 403)

Certificates

• Data Center Operations Engineering Certificate (p. 403)
• Engineering Systems Management Certificate (p. 403)

Industrial Engineering - BS

The four-year curriculum in industrial engineering at Texas A&M is designed to provide students with a solid basis in mathematics and science, as well as in engineering economics, manufacturing systems, production and inventory control, operations research, quality engineering, simulation, human factors and informatics. The program culminates with a senior design course in which students apply principles and knowledge acquired through the curriculum to an actual industrial problem.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.
### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 111 Foundations of Engineering II</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 151 Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 218 Mechanics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Semester Credit Hours</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

A grade of C or better is required.

1 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.

2 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

3 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MATH 251 Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 211 Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MMET 181 Manufacturing and Assembly Processes I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CSCE 206 Structured Programming in C</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ISEN 210 Fundamentals of Industrial Engineering Design</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>17</strong></td>
</tr>
<tr>
<td>Spring</td>
<td>MATH 304 Linear Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ISEN 230 Informatics for Industrial Engineers</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 221 Statics and Particle Dynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 222/ MSEN 222 Materials Science</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGL 210 Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>18</strong></td>
</tr>
<tr>
<td>Spring</td>
<td>ISEN 310 Uncertainty Modeling for Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ISEN 320 Operations Research I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 308 Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECEN 215 Principles of Electrical Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ISEN 330 Human Systems Interaction</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Technical electives</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td>Spring</td>
<td>ISEN 460 Capstone Senior Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 482/ PHIL 482 Ethics and Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Technical electives</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Semester Credit Hours</strong></td>
<td><strong>95</strong></td>
</tr>
</tbody>
</table>

A total of 18 hours of technical electives is required, of which 12 hours must be industrial engineering courses. The choice of courses to be taken must be made in consultation with the student's advisor and/or the Industrial Engineering Advising Office.

All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the INEN advising office.

The Bachelor of Science degree in Industrial Engineering requires a grade of C or better for required industrial engineering (ISEN) courses. If a course is repeated, only the most recent grade is used in fulfilling this requirement.

### Total Program Hours 128
Industrial Engineering - Minor

The Department of Industrial and Systems Engineering offers a minor in Industrial Engineering.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEN 310</td>
<td>Uncertainty Modeling for Industrial Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 320</td>
<td>Operations Research I</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 370</td>
<td>Production Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ISEN 320</td>
<td>Operations Research I</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 330</td>
<td>Human Systems Interaction</td>
<td></td>
</tr>
<tr>
<td>ISEN 340</td>
<td>Operations Research II</td>
<td></td>
</tr>
<tr>
<td>ISEN 350</td>
<td>Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>ISEN 355</td>
<td>System Simulation</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

Students must make a grade of "C" or better in all courses.

Data Center Operations Engineering - Certificate

With the rapid acceleration of technology through innovation on a global basis, industries recognize the need for young engineers who possess base line knowledge in areas of data system management and an understanding of the system level of complex data center processing systems. In both government and industry there is a growing need for undergraduate engineering students that possess the requisite knowledge and skill sets pertaining to complex data systems management and this certificate program includes a set of courses to assure students develop this knowledge and skill set. Completion of this certificate requires completion of the following educational outcomes:

1. to know and apply principles of engineering management
2. to understand principles of systems level engineering and their application to specific data center system operations
3. to be able to go beyond understanding concepts and demonstrate appropriate usage of systems engineering principles in a design context

For additional information, contact the Data Center Operations Engineering Certificate coordinator or Engineering Academic and Student Affairs, EABB, (979) 845-7200.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEN 411</td>
<td>Engineering Management Techniques</td>
<td>3</td>
</tr>
<tr>
<td>ISEN 440</td>
<td>Systems Thinking</td>
<td>3</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td></td>
</tr>
<tr>
<td>AERO 426</td>
<td>Space System Design</td>
<td></td>
</tr>
<tr>
<td>CHEN 461</td>
<td>Process Dynamics and Control</td>
<td></td>
</tr>
<tr>
<td>CVEN 402</td>
<td>Engineered Environmental Systems</td>
<td></td>
</tr>
<tr>
<td>ECEN 420</td>
<td>Linear Control Systems</td>
<td></td>
</tr>
<tr>
<td>ECEN 460</td>
<td>Power System Operation and Control</td>
<td></td>
</tr>
<tr>
<td>ISEN 414</td>
<td>Total Quality Engineering</td>
<td></td>
</tr>
<tr>
<td>ISTM 209</td>
<td>Business Information Systems Concepts</td>
<td></td>
</tr>
<tr>
<td>MEEN 441</td>
<td>Design of Mechanical Components and Systems</td>
<td></td>
</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society</td>
<td></td>
</tr>
<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
<td></td>
</tr>
<tr>
<td>PETE 325</td>
<td>Petroleum Production Systems</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 12
Department of Materials Science and Engineering

The Department of Materials Science and Engineering is jointly operated by the College of Engineering and College of Science. The department offers Master of Science, Master of Engineering and Ph.D. degrees and has more than 100 graduate students currently in the program who are working on a wide range of materials-related interdisciplinary research projects. This multidisciplinary department includes faculty members from several disciplines, including aerospace engineering, biology, biomedical engineering, chemical engineering, chemistry, electrical engineering, mechanical engineering, nuclear engineering and physics. Many of today’s most pressing scientific problems stem from the limitations of materials currently available, and this department is at the forefront of new knowledge and discovery at Texas A&M University.

What is Materials Science and Engineering?

Materials science and engineering involves the characterization of the physical and chemical properties of solid materials—metals and alloys, ceramics, magnetic materials, polymers, optical materials, semiconductors, superconductors, and composites—for the purpose of using, changing, or enhancing inherent properties to create or improve end products. Materials science and engineering involves examining how the microstructure (crystalline or amorphous) of a material can be changed to influence the strength, electrical conductivity, optical, or magnetic properties of a material. This field is inherently multidisciplinary, encompassing mechanical, chemical, biomedical, civil, electrical, and aerospace engineering; physics; and chemistry.

Materials science comprises the study of materials from the macro to the atomic scale—from highway building materials to carbon nanotubes—but, independent of scale, the study of materials is concerned fundamentally with the effect of structure and chemistry on the properties of materials. Materials have historically been so important that different eras of civilization were named according to the materials from which tools were fabricated; for example, the Stone Age, the Bronze Age, and the Iron Age. The development of the semiconductor spawned the modern era of information technology often called the Silicon Age. Advances in materials science might make this new millennium the Biomaterials/ Nanomaterials/Optical Materials Age.

What do Materials Scientists and Engineers do?

In industry, materials scientists and engineers work with natural or synthetic materials and, most often, with combinations of materials, to improve existing products or to develop novel products. For instance, at Intel, the developer of the processing chip used in most PCs, materials scientists optimize the materials used in chip packaging, balancing differing coefficients of thermal expansion, head dissipation, brittleness and compliancy, and cost for optimum performance and economic feasibility.

Other materials scientists are on the forefront of the revolution in biotechnology, developing materials for the components of artificial joints, heart valves, and other replacement body parts. Smart materials show a tremendous potential in medical and dental applications, such as compressible stents that reform to their intended shape upon contact with body heat once inserted into an artery, ceramic cement for bone repair, or shape-memory alloys to correct misplaced teeth or spine curvature. (Smart materials have one or more properties that can be dramatically altered, such as multiviscosity oil, with a viscosity that varies with temperature.)

Related research involves developing smaller and more reliable components, such as ferromagnetic activators acting as tiny machines in military and other applications. In aerospace engineering, materials scientists are developing airframe and fuselage materials with high strength-to-weight ratios, as well as developing smart materials into integrated sensors and actuators for reconfigurable wings and other adaptive structures.

For more information, visit the Department of Materials Science and Engineering (http://engineering.tamu.edu/materials) website.

Faculty

Arroyave, Raymundo, Professor  
Materials Science And Engineering  
PhD, Massachusetts Institute of Technology, 2004

Cagin, Tahir, Professor  
Materials Science And Engineering  
PhD, Clemson University, 1998

Case, Raymundo P, Professor of the Practice  
Materials Science And Engineering  
PhD, University of Manchester Institute of Science and Technology, 2002

Castaneda-Lopez, Homero, Associate Professor  
Materials Science And Engineering  
PhD, The Pennsylvania State University, 2001

Creasy, Terry S, Associate Professor  
Materials Science And Engineering  
PhD, University of Delaware, 1997

Demkowicz, Michal J, Associate Professor  
Materials Science And Engineering  
PhD, Massachusetts Institute of Technology, 2005

Hartwig, Karl T, Professor  
Materials Science And Engineering  
PhD, University of Wisconsin - Madison, 1977

Karaman, Ibrahim, Professor  
Materials Science And Engineering  
PhD, University of Illinois at Urbana-Champaign, 2000

Lendlein, Andreas, Professor  
Materials Science And Engineering  
PhD, Swiss Federal Institute of Technology Zurich, 1996

Ma, Ji, Lecturer  
Materials Science And Engineering  
PhD, Texas A&M University, 2012

Needleman, Alan, Distinguished Professor  
Materials Science And Engineering  
PhD, Harvard University, 1971

Pharr, George M, Professor  
Materials Science And Engineering  
PhD, Stanford University, 1979
Minors

- Materials Science and Engineering Minor (p. 405)

Materials Science and Engineering - Minor

The Department of Materials Science and Engineering minor (http://engineering.tamu.edu/materials/academics/degrees/undergraduate/minor) degree program is designed to provide a strong materials science educational program for undergraduate science and engineering majors and to integrate a materials focus into their undergraduate training. It is intended for students who are interested in broadening their undergraduate major program of study to incorporate a fundamental understanding of materials processing and structure–property relationships to complement their major degree. Students will have the flexibility to select relevant coursework in order to customize this program of study to best suit the particular student’s intended area of focus through consultation with an MSEN faculty advisor.

The minor program in materials science and engineering consists of a minimum of five (5) three-hour courses for a total of 15 credit hours, with up to six credit hours in materials courses within their major. All students are required to have completed a prerequisite, such as MSEN 222/MEEN 222—Materials Science, or MSEN 201—Introduction to Materials Science (or an equivalent course)—prior to applying for the minor. Two (2) three-hour courses (six credit hours) are selected from a list of core MSEN undergraduate courses. The remaining three courses (nine credit hours) are selected from upper-level materials focused technical electives. With the permission of the MSEN faculty advisor, students may substitute up to two technical electives with courses from their major department with a primary focus on materials science and engineering. Completion of the minor will be recorded on the student’s university transcript.

For more information, visit the Department of Materials Science and Engineering website (http://engineering.tamu.edu/materials).

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select at least two of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MEEN 467 Mechanical Behavior of Materials</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>MSEN 310 Structure of Materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 420 Polymer Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 460 Properties of Functional Materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select up to three of the following: 1, 2</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>MEEN 458 Processing and Characterization of Polymers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MEEN 471 Elements of Composite Materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 410 Materials Processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 489 Special Topics In... (Fundamentals of Ceramics)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 489 Special Topics In... (Fundamentals of Corrosion)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 489 Special Topics In... (Nanoscience and Nanomaterials)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSEN 491 Research</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

1 Upon consultation with the materials science faculty advisor, up to 2 upper-level technical electives in the student’s major department may be accepted in place of these courses.

2 Or additional courses from first list.

Students must make a grade of “C” or better in all courses.

Student must achieve an overall GPA of 2.5 in approved minor courses.

Department of Mechanical Engineering

Mechanical engineering is a highly diversified profession. The mechanical engineer designs machines, devices, various products and control systems, and works with the generation, conversion, transmission, and utilization of mechanical and thermal power. Assignments often include analysis and synthesis of mechanical, thermal, and fluid systems. Mechanical engineers are also responsible for characterization, specification, and analysis of materials used in design and manufacturing. Manufacturing systems, robotics, electromechanical devices, and control systems are also the purview of the mechanical engineer. Graduates in mechanical engineering are among the most versatile engineers and enjoy professional employment in industry, government, consulting, and research organizations. The undergraduate program in Mechanical Engineering at Texas A&M University is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

The work of mechanical engineers varies from general engineering to numerous, narrow specialties, as required by the wide variety of employers. A general list, though not in any way exhaustive, of the areas of professional employment opportunities available to mechanical engineers includes: design, construction, controls, materials specification and evaluation, analysis of thermal systems, fluid and solid mechanics, manufacturing, plant engineering, research and development,
and technical sales. Many mechanical engineers are promoted to management and administrative positions as well.

The mission of the Department of Mechanical Engineering is to serve the students of Texas A&M University, the State of Texas, and the nation by:

- providing quality education that is well-grounded in the fundamental principles of engineering, fostering innovation and preparing students for leadership positions and successful careers in industry, government, and academia;
- advancing the knowledge base of mechanical engineering to support the competitiveness of existing industry and to spawn new economic development in Texas and the nation through active involvement in basic and applied research in a global context; and
- successfully pursue life-long learning and advanced study opportunities, and subsequently contribute to the development of advanced concepts and leading edge technologies.

The objectives of the Mechanical Engineering program are to produce graduates who will:

- have successful careers, and become leaders, in industry and the public sector;
- appropriately apply acquired knowledge, work well with other people, effectively communicate ideas and technical information, and continue to learn and improve; and
- successfully pursue advanced studies, if they so choose, opportunities, and subsequently contribute to the development of advanced concepts and leading edge technologies.

The educational outcomes for the Mechanical Engineering program are that students will attain:

- an ability to apply knowledge of mathematics, science and engineering;
- an ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- an ability to function on multi-disciplinary teams;
- an ability to identify, formulate and solve engineering problems;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- a recognition of the need for, and an ability to engage in life-long learning;
- a knowledge of contemporary issues; and
- an ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Mechanical engineers should possess a thorough understanding of engineering science as well as analytical and practical skills in one of many basic mechanical engineering specialties. The mechanical engineering curriculum at Texas A&M requires students to develop and apply logical thinking, innovative approaches, and ethical standards as a prerequisite for professional competence. The curriculum consists of basic theory courses complemented by laboratory experiences in dynamic systems and controls, design, experimentation, fluid mechanics, heat transfer, manufacturing, and materials. Elective courses are offered in numerous areas including air conditioning, automotive engineering, computer-aided design, control systems, corrosion, energy conversion, internal combustion engines, manufacturing, materials, mechanical design, polymers, mechatronics, metallurgy, power generation, robotics, stress analysis, fluid mechanics, turbomachinery, and others. The selection of elective courses is dictated by the interests and goals of the student, working with departmental advisors and within the curriculum guidelines.

Many students enhance their education by participating in cooperative education and/or professional internships, which offer opportunities for employment in engineering positions while working toward a degree. Numerous study abroad programs are also available for gaining experience and perspectives in the international arena. Participation in student chapters of professional and honor societies provides leadership opportunities, collegial activities, and learning experiences outside the classroom. Many students also participate in research projects through individual directed studies courses with a professor. The mechanical engineering program culminates with a senior capstone design course sequence highlighted by real-life projects sponsored by various industries. Students benefit from the challenges and gratification that come through direct interaction with practicing engineers.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Faculty**

Allaire, Douglas L, Assistant Professor  
Mechanical Engineering  
PHD, Massachusetts Institute of Technology, 2009

Amini, Noushin, Visiting Assistant Professor  
Mechanical Engineering  
PHD, Texas A&M University, 2011

Anand, Nagamangala, Professor  
Mechanical Engineering  
PHD, Purdue University, 1983

Annamalai, Kalyan, Professor  
Mechanical Engineering  
PHD, Georgia Institute of Technology, 1975

Banerjee, Debjoti, Professor  
Mechanical Engineering  
PHD, University of California, Los Angeles, 1999

Caton, Jerald A, Professor  
Mechanical Engineering  
PHD, Massachusetts Institute of Technology, 1980

Charoenphol, Phapanin, Research Assistant Professor  
Mechanical Engineering  
DEN, University of Michigan, 2012

Childs, Dara W, Professor  
Mechanical Engineering  
PHD, The University of Texas at Austin, 1968
Chowdhury, Shahla, Lecturer
Mechanical Engineering
MS, University of Illinois at Urbana-Champaign, 2013
MS, Bangladesh University of Engineering & Technology, 2009

Claridge, David E, Professor
Mechanical Engineering
PHD, Stanford University, 1976

Cope, Dale A, Associate Professor of the Practice
Mechanical Engineering
PHD, Wichita State University, 2002

Darbha, Swaroop V, Professor
Mechanical Engineering
PHD, University of California, Berkeley, 1994

Delgado, Adolfo, Associate Professor
Mechanical Engineering
PHD, Texas A&M University, 2008

Donnell, James M, Professor of the Practice
Mechanical Engineering
BS, Texas A&M University, 1982

Doron, Yuval, Lecturer
Mechanical Engineering
MS, Texas A&M University, 2009

Felts, Jonathan R, Assistant Professor
Mechanical Engineering
PHD, University of Illinois at Urbana-Champaign, 2013

Freed, Alan D, Professor
Mechanical Engineering
PHD, University of Wisconsin-Madison, 1985

Gonezen, Sevan, Assistant Professor
Mechanical Engineering
PHD, Rensselaer Polytechnic Institute, 2011

Gopalswamy, Swaminathan, Professor of the Practice
Mechanical Engineering
PHD, University of California, Berkeley, 1991

Grunlan, Jaime C, Professor
Mechanical Engineering
PHD, University of Minnesota, Twin Cities, 2001

Gu, Lili, Visiting Assistant Professor
Mechanical Engineering
PHD, Tsinghua University, China, 2015

Haglund, John S, Senior Lecturer
Mechanical Engineering
PHD, Texas A&M University, 2003

Hajimirza, Shima, Assistant Professor
Mechanical Engineering
PHD, Texas A&M University, 2013

Han, Je C, Distinguished Professor
Mechanical Engineering
PHD, Massachusetts Institute of Technology, 1977

Hogan, Harry A, Professor
Mechanical Engineering
PHD, Texas A&M University, 1984

Hur, Pilwon, Assistant Professor
Mechanical Engineering
PHD, University of Illinois at Urbana-Champaign, 2010

Jacobs, Timothy J, Professor
Mechanical Engineering
PHD, University of Michigan, 2005

Kim, Haejune, Research Assistant Professor
Mechanical Engineering
PHD, University of Wisconsin-Milwaukee, 2014

Kim, Won-Jong, Associate Professor
Mechanical Engineering
PHD, Massachusetts Institute of Technology, 1997

Kim, Yong-Joe, Associate Professor
Mechanical Engineering
PHD, Purdue University, 2003

Kulatilaka, Waruna D, Associate Professor
Mechanical Engineering
PHD, Purdue University, 2006

Lau, Sai C, Professor
Mechanical Engineering
PHD, University of Minnesota, Twin Cities, 1980

Layton, Astrid C, Assistant Professor
Mechanical Engineering
PHD, Georgia Institute of Technology, 2014

Lee, Sungyon, Assistant Professor
Mechanical Engineering
PHD, Massachusetts Institute of Technology, 2010

Li, Ying, Associate Professor
Mechanical Engineering
PHD, University of Florida, 2007

Liang, Hong, Professor
Mechanical Engineering
PHD, Stevens Institute of Technology, 1992

Malak, Richard J, Associate Professor
Mechanical Engineering
PHD, Georgia Institute of Technology, 2008

McAdams, Daniel A, Professor
Mechanical Engineering
PHD, The University of Texas at Austin, 1999

McVay, Matilda W, Instructional Associate Professor
Mechanical Engineering
PHD, Texas A&M University, 1996

Moreno, Michael R, Assistant Professor
Mechanical Engineering
PHD, Texas A&M University, 2009
Muliana, Hanifah, Professor
Mechanical Engineering
PHD, Georgia Institute of Technology, 2004

Ozkan, Tanil, Instructional Assistant Professor
Mechanical Engineering
DEN, University of Illinois at Urbana-Champaign, 2014

Pagilla, Prabhakar R, Professor
Mechanical Engineering
PHD, University of California, Berkeley, 1996

Palazzolo, Alan B, Professor
Mechanical Engineering
PHD, University of Virginia, 1981

Pate, Michael B, Professor
Mechanical Engineering
PHD, Purdue University, 1982

Petersen, Eric L, Professor
Mechanical Engineering
PHD, Stanford University, 1998

Pharr, George, Assistant Professor
Mechanical Engineering
PHD, Harvard University, 2014

Polycarpou, Andreas A, Professor
Mechanical Engineering
PHD, State University of New York at Buffalo, 1994

Rajagopal, Kumbakonam, Distinguished Professor
Mechanical Engineering
PHD, University of Minnesota, Twin Cities, 1978

Rasmussen, Bryan P, Associate Professor
Mechanical Engineering
PHD, University of Illinois at Urbana-Champaign, 2005

Ratnam, Sivakumar, Associate Professor
Mechanical Engineering
PHD, University of California, Berkeley, 2007

Reddy, Junuthula N, Distinguished Professor
Mechanical Engineering
PHD, The University of Alabama in Huntsville, 1974

Ryu, Seok Chang, Assistant Professor
Mechanical Engineering
PHD, Stanford University, 2013

Sanandres, Luis A, Professor
Mechanical Engineering
PHD, Texas A&M University, 1985

Saripalli, Srikanth, Associate Professor
Mechanical Engineering
PHD, University of Southern California, 2007

Schobeiri, Taher M, Professor
Mechanical Engineering
PHD, Technische Universitat Darmstadt, Germany, 1979

Srinivasa, Arun R, Professor
Mechanical Engineering
PHD, University of California, Berkeley, 1991

Staack, David A, Associate Professor
Mechanical Engineering
PHD, Drexel University, 2008

Suh, Chii-Der, Associate Professor
Mechanical Engineering
PHD, Texas A&M University, 1997

Tai, Li-Jung, Assistant Professor
Mechanical Engineering
PHD, University of Michigan, 2011

Tsenn, Joanna N, Instructional Assistant Professor
Mechanical Engineering
PHD, Texas A&M University, 2016

Vinayak, Fnu, Assistant Professor
Mechanical Engineering
PHD, Purdue University, 2016

Wen, Sy-Bor, Associate Professor
Mechanical Engineering
PHD, University of California, Berkeley, 2006

Yu, Choongho, Associate Professor
Mechanical Engineering
PHD, The University of Texas at Austin, 2004

Majors
- Bachelor of Science in Mechanical Engineering (p. 408)

Minors
- Analysis, Design and Management of Energy Conversion Systems Minor (p. 411)
- Control of Mechanical Systems Minor (p. 411)
- Design and Simulation of Mechanical Systems Minor (p. 411)

Mechanical Engineering - BS
Mechanical engineering is a highly diversified profession. The mechanical engineer designs machines, devices, various products and control systems, and works with the generation, conversion, transmission, and utilization of mechanical and thermal power. Assignments often include analysis and synthesis of mechanical, thermal, and fluid systems. Mechanical engineers are also responsible for characterization, specification, and analysis of materials used in design and manufacturing. Manufacturing systems, robotics, electromechanical devices, and control systems are also the purview of the mechanical engineer. Graduates in mechanical engineering are among the most versatile engineers and enjoy professional employment in industry, government, consulting, and research organizations. The undergraduate program in Mechanical Engineering at Texas A&M University is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

The work of mechanical engineers varies from general engineering to numerous, narrow specialties, as required by the wide variety of employers. A general list, though not in any way exhaustive, of
of many basic mechanical engineering specialties. The mechanical engineering curriculum at Texas A&M requires students to develop and apply logical thinking, innovative approaches, and ethical standards as a prerequisite for professional competence. The curriculum consists of basic theory courses complemented by laboratory experiences in dynamic systems and controls, design, experimentation, fluid mechanics, heat transfer, manufacturing, and materials. Elective courses are offered in numerous areas including air conditioning, automotive engineering, computer-aided design, control systems, corrosion, energy conversion, internal combustion engines, manufacturing, materials, mechanical design, polymers, mechatronics, metallurgy, power generation, robotics, stress analysis, fluid mechanics, turbomachinery, and others. The selection of elective courses is dictated by the interests and goals of the student, working with departmental advisors and within the curriculum guidelines.

Many students enhance their education by participating in cooperative education and/or professional internships, which offer opportunities for employment in engineering positions while working toward a degree. Numerous study abroad programs are also available for gaining experience and perspectives in the international arena. Participation in student chapters of professional and honor societies provides leadership opportunities, collegial activities, and learning experiences outside the classroom. Many students also participate in research projects through individual directed studies courses with a professor. The mechanical engineering program culminates with a senior capstone design course sequence highlighted by real-life projects sponsored by various industries. Students benefit from the challenges and gratification that come through direct interaction with practicing engineers.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Program Requirements**

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two-semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111 Foundations of Engineering</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151 Engineering Mathematics</td>
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<td>PHYS 218 Mechanics</td>
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<td>Course Code</td>
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</tr>
<tr>
<td>Fall</td>
<td>MEEN 210</td>
</tr>
<tr>
<td></td>
<td>MATH 251</td>
</tr>
<tr>
<td></td>
<td>MEEN 222/ MSEN 222</td>
</tr>
<tr>
<td></td>
<td>MEEN 225</td>
</tr>
<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td>Spring</td>
<td>CVEN 305</td>
</tr>
<tr>
<td></td>
<td>ECEN 215</td>
</tr>
<tr>
<td></td>
<td>MATH 308</td>
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<tr>
<td></td>
<td>MEEN 315</td>
</tr>
<tr>
<td></td>
<td>MEEN 260</td>
</tr>
<tr>
<td>Summer</td>
<td>High Impact Experience</td>
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**University Core Curriculum (p. 21)**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MEEN 260</td>
<td>Mechanical Measurements</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CVEN 305</td>
<td>Mechanics of Materials</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 260</td>
<td>Mechanical Measurements</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Semester</th>
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<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MEEN 399</td>
<td>High Impact Experience for Mechanical Engineers</td>
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</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGR 482/ PHIL 482</td>
<td>Ethics and Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 401</td>
<td>Introduction to Mechanical Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 404</td>
<td>Engineering Laboratory</td>
<td>3</td>
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<tr>
<td></td>
<td>Technical elective</td>
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<td></td>
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<tr>
<td></td>
<td>STEM Course</td>
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<td>Select one of the following:</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>MEEN 421</td>
<td>Thermal-Fluids Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 431</td>
<td>Advanced System Dynamics and Controls</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 475</td>
<td>Materials in Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 421</td>
<td>Thermal-Fluids Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 431</td>
<td>Advanced System Dynamics and Controls</td>
<td>3</td>
</tr>
</tbody>
</table>
5 Stem courses and technical elective: See the Mechanical Engineering Academic Advisor’s Office for a list of approved courses.

6 All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the MEEN advising office.

This curriculum lists the minimum number of classes required for graduation. Additional courses may be taken.

**Total Program Hours 128**

**Analysis, Design and Management of Energy Conversion Systems - Minor**

The objectives of the Mechanical Engineering minor - Analysis, Design and Management of Energy Conversion Systems - are to expand the working knowledge of mechanical engineering principles to broader engineering activities and to provide non-MEEN students with a specialized aspect of mechanical engineering to enhance their skillset and capabilities within their discipline-specific field. Candidates for a Mechanical Engineering minor must be high-achieving in their own discipline, with a minimum GPA of 3.5. Students may apply for the minor as early as their fourth semester of college but before their seventh semester of college. Students are responsible for the satisfying course pre-requisites (C or better) which may or may not apply toward the minor or the student’s major degree.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEEN 344</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 421</td>
<td>Thermal-Fluids Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 461</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
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Select two from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEEN 410</td>
<td>Internal Combustion Engines</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 436</td>
<td>Principles of Heating, Ventilating and Air Conditioning</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 437</td>
<td>Principles of Building Energy Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 472</td>
<td>Gas Dynamics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours**

15

Minimum of 6 hours at 300- to 400-level.

3.5 minimum overall GPA.

**Design and Simulation of Mechanical Systems - Minor**

The objectives of the Mechanical Engineering minor - Design and Simulation of Mechanical Systems - are to expand the working knowledge of mechanical engineering principles to broader engineering activities and to provide non-MEEN students with a specialized aspect of mechanical engineering to enhance their skillset and capabilities within their discipline-specific field. Candidates for a Mechanical Engineering minor must be high-achieving in their own discipline, with a minimum GPA of 3.5. Students may apply for the minor as early as their fourth semester of college but before their seventh semester of college. Students are responsible for the satisfying course pre-requisites (C or better) which may or may not apply toward the minor or the student’s major degree.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEEN 363</td>
<td>Dynamics and Vibrations</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 364</td>
<td>Dynamic Systems and Controls</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 431</td>
<td>Advanced System Dynamics and Controls</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEEN 408</td>
<td>Introduction to Robotics</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 411</td>
<td>Mechanical Controls</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 432</td>
<td>Automotive Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 433</td>
<td>Mechatronics</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 434</td>
<td>Dynamics and Modeling of Mechatronic System</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 459</td>
<td>Sound and Vibration Measurements</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours**

15

Minimum of 6 hours at 300- to 400-level.

3.5 minimum overall GPA.

**Control of Mechanical Systems - Minor**

The objectives of the Mechanical Engineering minor - Control of Mechanical Systems - are to expand the working knowledge of
The missions of the Department of Nuclear Engineering are:

1. to produce high-quality graduates from the undergraduate through the doctoral levels to help meet the technical manpower needs of our state, region, nation, and the international community;
2. to conduct research, including collaboration with research in related fields, to advance the state of knowledge in these disciplines in support of the needs of society; and
3. to perform service in these disciplines for many constituencies including our College and University, industry, government and national laboratories, professional organizations, and the public.

In fulfilling these missions, the objective of the undergraduate program is to prepare students for success in their professional endeavors following the baccalaureate degree. These endeavors may include direct employment in the private or public sectors, graduate studies in engineering or science, professional studies in medicine, business, law or public administration, service in the military, or entrepreneurial activities. To achieve this purpose, four principal educational objectives are identified. Graduates of our Bachelor of Science program in Nuclear Engineering:

1. will work on the challenges of maintenance, improvement, innovation, education, and research in nuclear power and industrial utilization of nuclear radiation and radionuclides. In this work, they will fulfill independent assignments, engage in collaborations, and manage the work of others with effective communications characterizing all phases of their responsibilities;
2. will conduct their professional activities with full recognition of the choices and challenges implicit to their work, to its ethical dimensions, and to their implications for matters beyond their immediate tasks;
3. will take the local, global, historical, social, economic, and political settings into account in both their domestic and international endeavors; and
4. will recognize and utilize both the accumulated body of results from prior work and the continuing evolution of science and technology as essential resources for the effective conduct of their work.

The nuclear engineering baccalaureate degree programs stress engineering science fundamentals and mathematics. However, considerable numbers of elective hours are available in the curriculum to permit students to broaden their educations as desired.

Most of the facilities used in the MS and PhD programs are also used in the undergraduate degree programs. These facilities make the Department of Nuclear Engineering one of the best equipped in the United States. Texas A&M is now the only University in the United States with two nuclear reactors on its campus.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

Faculty

Adams, Marvin L, Professor
Nuclear Engineering
PhD, University of Michigan, 1986

Akabani, Gamal, Associate Professor
Nuclear Engineering
PhD, Texas A&M University, 1990

Chirayath, Sunil, Research Associate Professor
Nuclear Engineering
PhD, University of Madras, India, 2005

Ford, John R, Associate Professor
Nuclear Engineering
PhD, University of Tennessee, 1992

Kee, Ernie J L, Associate Professor of the Practice
Nuclear Engineering
BS, University of Idaho, 1978

Kimber, Mark L, Assistant Professor
Nuclear Engineering
PhD, Purdue University, 2008

Kirkland, Karen V, Associate Professor
Nuclear Engineering
PhD, The University of Tokyo, 1999

Marianno, Craig M, Assistant Professor
Nuclear Engineering
PhD, Oregon State University, 2000

McClarren, Ryan G, Associate Professor
Nuclear Engineering
PhD, University of Michigan, 2007
McDeavitt, Sean M, Associate Professor
Nuclear Engineering
PHD, Purdue University, 1992

Morel, Jim E, Professor
Nuclear Engineering
PHD, The University of New Mexico, 1979

Nguyen, Thien, Research Assistant Professor
Nuclear Engineering
PHD, Ritsumeikan University, 2010

Ostrovskaya, Natela G, Senior Lecturer
Nuclear Engineering
PHD, Texas A&M University, 2005

Peddicord, Kenneth L, Professor
Nuclear Engineering
PHD, University of Illinois at Urbana-Champaign, 1972

Poston, John W, Professor
Nuclear Engineering
PHD, Georgia Institute of Technology, 1971

Ragusa, Jean C, Professor
Nuclear Engineering
PHD, Institut National Polytechnique de Grenoble, France, 2002

Shao, Lin, Professor
Nuclear Engineering
PHD, University of Houston, 2001

Tsvetkov, Pavel V, Associate Professor
Nuclear Engineering
PHD, Texas A&M University, 2002

Vaghetto, Rodolfo, Research Assistant Professor
Nuclear Engineering
PHD, Texas A&M University, 2013

Majors
• Bachelor of Science in Nuclear Engineering (p. 413)

Minors
• Nuclear Engineering Minor (p. 414)
• Radiological Health Engineering Minor (p. 414)

Nuclear Engineering - BS
The Department of Nuclear Engineering offers a BS in Nuclear Engineering.

Program Requirements
The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year
Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
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Total Semester Credit Hours 16

Spring

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<th>Course</th>
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<tbody>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 17

Total Semester Credit Hours 33

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Second Year
Fall

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<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
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Nuclear Engineering - Minor

Program Requirements

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<th>Code</th>
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<tbody>
<tr>
<td>NUEN 301</td>
<td>Nuclear Reactor Theory</td>
<td>3</td>
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<tr>
<td>NUEN 302</td>
<td>Introduction to Nuclear Engineering II</td>
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</tr>
<tr>
<td>NUEN 303</td>
<td>Nuclear Detection and Isotope Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 304</td>
<td>Nuclear Reactor Analysis</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 405</td>
<td>Nuclear Engineering Experiments</td>
<td>3</td>
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<tr>
<td>NUEN Technical elective (p. 912) 6</td>
<td>3</td>
<td></td>
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</tbody>
</table>

Students must make a grade of “C” or better in all courses.

Radiological Health Engineering - Minor

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEN 301</td>
<td>Nuclear Reactor Theory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 302</td>
<td>Introduction to Nuclear Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 303</td>
<td>Nuclear Detection and Isotope Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 405</td>
<td>Nuclear Engineering Experiments</td>
<td>3</td>
</tr>
<tr>
<td>NUEN Technical elective 6</td>
<td>3</td>
<td></td>
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<tr>
<td>NUEN Technical elective (p. 912) 6</td>
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<tr>
<td>NUEN Technical elective 6</td>
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</tbody>
</table>

Students must make a grade of “C” or better in all courses.

Total Program Hours 128

Nuclear Engineering - Minor

The Department of Nuclear Engineering offers a minor in Nuclear Engineering.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEN 301</td>
<td>Nuclear Reactor Theory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 302</td>
<td>Introduction to Nuclear Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 303</td>
<td>Nuclear Detection and Isotope Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 304</td>
<td>Nuclear Reactor Analysis</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 405</td>
<td>Nuclear Engineering Experiments</td>
<td>3</td>
</tr>
<tr>
<td>NUEN Technical elective 6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>NUEN Technical elective (p. 912) 6</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Students must make a grade of “C” or better in all courses.

Radiological Health Engineering - Minor

The Department of Nuclear Engineering offers a minor in Radiological Health Engineering. Expanding and emerging nuclear applications have created a strong demand for specialists in radiological health engineering. Well-educated individuals are, and will be, required in all aspects of the nuclear power industry from mining all the way to disposal of wastes from spent fuel. There are needs for radiological health specialists in government, hospitals, educational institutions and private industry. This program at Texas A&M is designed to give students a broad background so they will be able to assume positions in any area of the nuclear industry.

Program Requirements

<table>
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<tr>
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</tr>
<tr>
<td>NUEN Technical elective (p. 912) 6</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Students must make a grade of “C” or better in all courses.
The Department of Ocean Engineering is a two-campus department with campuses located in College Station and Galveston, Texas. The laboratory facilities accessible to the Department of Ocean Engineering are among the most comprehensive in the nation for testing offshore, dredging and coastal systems. The College Station facilities are located in the Reta and Bill Haynes ’46 Coastal Engineering Laboratory, the Offshore Technology Research Center and the Civil Engineering Laboratory Building. These facilities include a large deep water wave basin, a towing tank and model dredge, a wave channel, fluid dynamics laboratory equipment, a shallow water wave basin and data acquisition systems. The facilities in Galveston include naval architecture, fluid dynamics, and geotechnical experimental equipment, and two wave channels. The Galveston campus also provides access to the Gulf of Mexico through the use of small boats and research vessels that are available for education and research. Additional information is available on the Department of Ocean Engineering website: http://engineering.tamu.edu/ocean.

Before commencing course work in the major, students must be admitted to the major or have the approval of the department head.

**Faculty**

- Carney, Sara E, Assistant Lecturer
  Ocean Engineering
  MS, Texas A&M University, 2016

- Falzarano, Jeffrey M, Professor
  Ocean Engineering
  PHD, University of Michigan, 1990

- Figlus, Jens, Assistant Professor
  Ocean Engineering
  PHD, University of Delaware, 2010

- Girimaji, Sharath S, Professor
  Ocean Engineering
  PHD, Cornell University, 1990

- Gordon, Robert B, Senior Lecturer
  Ocean Engineering
  PHD, University of Rhode Island, 1982

- Greer, Matthew N, Senior Lecturer
  Ocean Engineering
  MS, Massachusetts Institute of Technology, 1979

- Horrillo, Juan J, Associate Professor
  Ocean Engineering
  PHD, University of Alaska Fairbanks, 2006

- Kang, Heonyong, Research Assistant Professor
  Ocean Engineering
  PHD, Texas A&M University, 2014

- Kian, Rozita, Research Assistant Professor
  Ocean Engineering
  PHD, Middle East Technical University, 2015
Kim, Moohyun, Professor
Ocean Engineering
PHD, Massachusetts Institute of Technology, 1988

Koola, Paul M, Professor of the Practice
Ocean Engineering
MBA, Texas A&M University, 2000
PHD, Indian Institute of Technology, Madras, 1991

Na, Byoungjoon, Research Assistant Professor
Ocean Engineering
PHD, Texas A&M University, 2010

Parihar, Arun, Lecturer
Ocean Engineering
MS, University of Houston, 2008

Perlin, Marc, Professor
Ocean Engineering
PHD, University of Florida, 1989

Randall, Robert E, Professor
Ocean Engineering
PHD, University of Rhode Island, 1972

Rodriguez, Ignacio J, Distinguished Professor
Ocean Engineering
PHD, Colorado State University, 1967

Shaw, Surupa, Lecturer
Ocean Engineering
PHD, University of New Hampshire, 2015

Subramanian, Rahul, Lecturer
Ocean Engineering
PHD, University of Michigan, 2012

Sweetman, John A, Professor
Ocean Engineering
PHD, Stanford University, 2001

Wood, Amanda L, Instructional Assistant Professor
Ocean Engineering
PHD, University of Houston, 2010

Majors

• Bachelor of Science in Ocean Engineering (p. 416)

Ocean Engineering - BS

The basic science and mathematics include two semesters of physics and one semester of chemistry with laboratories and mathematics through differential equations and one course in statistics. Fundamental engineering courses such as foundations in engineering, engineering statics, dynamics, materials, mechanics of deformable bodies, thermodynamics or electrical engineering, geotechnical engineering develop strong understanding of engineering basics. Courses that directly apply to ocean engineering include: coastal engineering, dynamics of ocean systems, engineering design of offshore and coastal systems, fluid dynamics and fluid dynamics laboratory, marine hydrodynamics, naval architecture, numerical methods, ocean engineering laboratory, ocean engineering wave mechanics, oceanography, offshore and coastal structures, underwater acoustics, senior capstone design project, steel and concrete design, and underwater and moored system design. The technical elective program provides students ability to develop some emphasis in offshore, coastal, or underwater systems. The ocean engineering curriculum includes courses in written communication skills, language, engineering ethics, philosophy and culture, social sciences and American heritage to ensure a well-rounded education.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111 Foundations of Engineering</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151 Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 218 Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 107 General Chemistry for Engineering Students</td>
<td>3</td>
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<tr>
<td>CHEM 117 General Chemistry for Engineering Students Laboratory</td>
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<tr>
<td>ENGR 112 Foundations of Engineering II</td>
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<tr>
<td>MATH 152 Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208 Electricity and Optics</td>
<td>4</td>
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<tr>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>17</td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.

BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112.

Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCEN 221</td>
<td>Engineering Mechanics: Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
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<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
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</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>OCEN 201</td>
<td>Introduction to Ocean Engineering</td>
<td>3</td>
</tr>
<tr>
<td>University Core Curriculum</td>
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</table>

Semester Credit Hours: 18

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>OCEN 213</td>
<td>Principles of Materials Engineering</td>
</tr>
<tr>
<td>OCEN 214</td>
<td>Mechanics of Deformable Bodies</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
</tr>
<tr>
<td>or OCEN 215</td>
<td>Principles of Electrical Engineering</td>
</tr>
<tr>
<td>University Core Curriculum (p. 21)</td>
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Semester Credit Hours: 3

Third Year

Fall

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>OCEN 261</td>
<td>Applied Numerical Methods</td>
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<tr>
<td>CVEN 311</td>
<td>Fluid Dynamics</td>
</tr>
<tr>
<td>OCEN 336</td>
<td>Fluid Dynamics Laboratory</td>
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<tr>
<td>CVEN 345</td>
<td>Theory of Structures</td>
</tr>
<tr>
<td>OCNG 410</td>
<td>Physical Oceanography</td>
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<td>University Core Curriculum</td>
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</table>

Semester Credit Hours: 3

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>OCEN 363</td>
<td>Dynamics and Vibrations</td>
</tr>
<tr>
<td>OCEN 265</td>
<td>Introduction to Geotechnical Engineering</td>
</tr>
<tr>
<td>or OCEN 415</td>
<td>or Offshore Structure Design</td>
</tr>
<tr>
<td>OCEN 300</td>
<td>Ocean Engineering Wave Mechanics</td>
</tr>
<tr>
<td>OCEN 362</td>
<td>Hydromechanics</td>
</tr>
<tr>
<td>Technical Elective</td>
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<tr>
<td>High Impact Experience</td>
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Semester Credit Hours: 15

Fourth Year

Fall

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>OCEN 400</td>
<td>Basic Coastal Engineering</td>
</tr>
<tr>
<td>OCEN 402</td>
<td>Principles of Naval Architecture</td>
</tr>
<tr>
<td>OCEN 403</td>
<td>Dynamics of Offshore Structures</td>
</tr>
<tr>
<td>OCEN 406</td>
<td>Capstone Design I</td>
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<tr>
<td>Technical elective</td>
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Semester Credit Hours: 16

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>OCEN 407</td>
<td>Design of Ocean Engineering Facilities II</td>
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<tr>
<td>OCEN 410</td>
<td>Ocean Engineering Laboratory</td>
</tr>
<tr>
<td>Technical elective</td>
<td></td>
</tr>
<tr>
<td>OCEN 401</td>
<td>Underwater Acoustics for Ocean Engineers</td>
</tr>
<tr>
<td>OCEN 481</td>
<td>Seminar</td>
</tr>
<tr>
<td>ENGR 482 / PHIL 482</td>
<td>Ethics and Engineering</td>
</tr>
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</table>

Semester Credit Hours: 15

Total Semester Credit Hours: 95

1 To be selected from the University Core Curriculum. Of the 18 hours shown as University Core Curriculum electives, 3 hours must be from creative arts, 3 from social and behavioral sciences, 6 from American history, 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences, and American history requirements if they are also on the approved list of international and cultural diversity courses.

2 Select from CVEN 446, OCEN 344.

3 All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the OCEN advising office.

4 Select from OCEN 405, OCEN 408, OCEN 411.

5 All students must take at least two courses in their major that are designated as writing intensive (W). ENGR 482/PHIL 482 and OCEN 410 taken at Texas A&M satisfy this requirement.

6 This technical elective must be approved by the department head or the undergraduate advisor. Technical electives are chosen from the approved technical elective list.

A grade of C or better is required in all required mathematics (MATH), civil engineering (CVEN) and ocean (OCEN) engineering courses taken to satisfy degree requirements.

Total Program Hours 128

Harold Vance Department of Petroleum Engineering

Petroleum Engineering is concerned primarily with the economic extraction of oil, gas, and other natural resources from the earth. Oil and gas is produced through the design, drilling and operation of wells
and well systems, and the integrated management of the underground reservoirs in which the resources are found.

The mission of the Petroleum Engineering Department is to create, preserve, integrate, transfer and apply petroleum engineering knowledge and to enhance the human capability of its practitioners. The Petroleum Engineering Program has two educational objectives:

- graduates will have the technical depth and breadth to be successful professionals early in their careers; and
- graduates will have the broad technical knowledge and soft skills needed to rise to positions of professional leadership.

In essence, the goal of the Petroleum Engineering curriculum is to provide a modern engineering education with proper balance between fundamentals and practice, and to graduate engineers capable of being productive contributors immediately who are also prepared for life-long learning. The curriculum includes study of:

- design and analysis of well systems and procedures for drilling and completing wells;
- characterization and evaluation of subsurface geological formations and their resources;
- design and analysis of systems for producing, injecting and handling fluids;
- application of reservoir engineering principles and practices for optimizing resource development and management; and
- use of project economics and resource valuation methods for design and decision making under conditions of risk and uncertainty.

There is a heavy emphasis on mathematics, computer applications, communication skills and interdisciplinary problem solving. As a result, Aggie petroleum engineers are in high demand in the industry, and their starting salaries are consistently among the top in the University and the nation.

The department is well known for its curriculum, facilities and faculty, and its undergraduate program was recognized as one of the top petroleum engineering programs in the United States. The faculty comprises more than 41 professors and lecturers, many of them widely known and globally involved in the petroleum industry. Three (3) of the faculty are members of the prestigious National Academy of Engineering, and 18 are Distinguished Members of the Society of Petroleum Engineers. The Bachelor of Science program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Students must work as interns during the summer months; a minimum of six weeks of approved experience is required for graduation. The department also participates in the Cooperative Education Program.

In addition to the Bachelor of Science degree in Petroleum Engineering, the department also offers both masters and doctoral degrees, including the Master of Science and Master of Engineering, and the Doctor of Philosophy and Doctor of Engineering (see the Texas A&M University Graduate and Professional Catalog).

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

Faculty

Abedi Mashhadimighani, Sara, Assistant Professor
Petroleum Engineering
PHD, University of Southern California, 2012

Akkutlu, Ibrahim Y, Associate Professor
Petroleum Engineering
PhD, University of Southern California, 2002

Barrufet, Maria A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1987

Bastian, Peter A, Professor of the Practice
Petroleum Engineering
MS, Texas A&M University, 1983

Blasingame, Thomas A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1989

Dattagupta, Akhil, Distinguished Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1992

Dupriest, Fred E, Professor of the Practice
Petroleum Engineering
BS, Texas A&M University, 1977

Gildin, Eduardo, Associate Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 2006

Hasan, Abu Rashid, Professor
Petroleum Engineering
PHD, University of Waterloo, Canada, 1979

Hasckir, Berna, Assistant Professor
Petroleum Engineering
PHD, Middle East Technical University, 2008

Holditch, Stephen A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1976

Jochen, John E, Senior Lecturer
Petroleum Engineering
MS, Texas A&M University, 1993

Kennedy, William D, Professor of the Practice
Petroleum Engineering
MS, The University of Texas at Dallas, 1982
MS, The University of Texas at Dallas, 1980

Killough, John E, Professor
Petroleum Engineering
PHD, Rice University, 1986

Kim, Jihoon, Assistant Professor
Petroleum Engineering
PHD, Stanford University, 2010
King, Michael J, Professor
Petroleum Engineering
PHD, Syracuse University, 1980

Laprea Bigott, Marcelo, Professor of the Practice
Petroleum Engineering
PHD, Texas A&M University, 1979

Lee, William J, Professor
Petroleum Engineering
PHD, Georgia Institute of Technology, 1963

Liang, Jenn T, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1988

Maggard, Bryan, Senior Lecturer
Petroleum Engineering
PHD, Texas A&M University, 2000

McCain, William D, Visiting Professor
Petroleum Engineering
PHD, Georgia Institute of Technology, 1964

McLeroy, Priscilla G, Professor of the Practice
Petroleum Engineering
MEN, Stanford University, 1986

McVay, Duane A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1994

Moridis, George J, Professor
Petroleum Engineering
PHD, Texas A&M University, 1987

Morita, Nobuo, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1974

Nascentes Alves, Ibere, Professor of the Practice
Petroleum Engineering
PHD, University of Tulsa, 1991

Nasr-El-Din, Hisham A, Professor
Petroleum Engineering
PHD, University of Saskatchewan, 1984

Nasrabadi, Hadi, Assistant Professor
Petroleum Engineering
PHD, Imperial College London, United Kingdom, 2006

Noynaert, Samuel F, Assistant Professor
Petroleum Engineering
PHD, Texas A&M University, 2013

Rodrigues De Paula Lima, Heitor, Professor of the Practice
Petroleum Engineering
PHD, Texas A&M University, 1998

Schechter, David S, Associate Professor
Petroleum Engineering
PHD, Bristol University, 1989

Schubert, Jerome J, Associate Professor
Petroleum Engineering
PHD, Texas A&M University, 1999

Sliva, Catherine A, Associate Professor of the Practice
Petroleum Engineering
BS, Texas A&M University, 1980

Sliva, Glenn M, Associate Professor of the Practice
Petroleum Engineering
BS, Texas A&M University, 1981

Smith, Terri S, Lecturer
Petroleum Engineering
MA, California State University, Bakersfield, 1993

Valko, Peter P, Professor
Petroleum Engineering
PHD, Institute of Catalysis, 1981

Voneiff, George W, Professor of the Practice
Petroleum Engineering
MS, Texas A&M University, 1992

Weijermars, Rudy, Professor
Petroleum Engineering
PHD, University of Uppsala, Sweden, 1987

Wu, Kan, Assistant Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 2014

Zhu, Ding, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1992

Majors
• Bachelor of Science in Petroleum Engineering (p. 419)

Minors
• Petroleum Engineering Minor (p. 421)

Certificates
• Energy Engineering Certificate (p. 421)

Petroleum Engineering - BS
The Department of Petroleum Engineering offers a BS in Petroleum Engineering.

Program Requirements
The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering. The freshman year is slightly different for chemical engineering. In that students take CHEM 101/111 or CHEM 107/117 and CHEM 102/112. Biomedical Engineering also requires a two-semester sequence of chemistry courses consisting
Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
<tr>
<td></td>
<td>ENGR 111</td>
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<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td></td>
<td>PHYS 218</td>
<td>Mechanics</td>
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<tr>
<td></td>
<td>University Core Curriculum (p. 21)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
<tr>
<td>Spring</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
</tr>
<tr>
<td></td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
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<td>Engineering Mathematics II</td>
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<td></td>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<td></td>
<td>Total Semester Credit Hours</td>
<td>33</td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts (for Industrial Distribution this is 3 hours from language, philosophy and culture, see IDIS curriculum for more information), 3 from social and behavioral sciences, 6 from American history, and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences (for Industrial Distribution this is language, philosophy and culture), and American history requirements if they are also on the approved list of international and cultural diversity courses.
4 BMEN and CHEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 101/CHEM 117.

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
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<tbody>
<tr>
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<tr>
<td></td>
<td>COMM 203</td>
<td>Public Speaking</td>
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<td></td>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td></td>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<tr>
<td></td>
<td>GEOL 104</td>
<td>Physical Geology</td>
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<td></td>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
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<tr>
<td></td>
<td>MEEN 221</td>
<td>Statics and Particle Dynamics</td>
</tr>
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<td>PETE 225</td>
<td>Introduction to Drilling Systems</td>
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Spring

<table>
<thead>
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<tr>
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<td>CVEN 305</td>
<td>Mechanics of Materials</td>
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<td>MATH 308</td>
<td>Differential Equations</td>
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<td></td>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
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<tr>
<td></td>
<td>PETE 311</td>
<td>Reservoir Petrophysics</td>
</tr>
<tr>
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<td>University Core Curriculum (p. 21)</td>
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Third Year

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<td>GEOL 404</td>
<td>Geology of Petroleum</td>
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<td></td>
<td>PETE 301</td>
<td>Petroleum Engineering Numerical Methods</td>
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<td>PETE 310</td>
<td>Reservoir Fluids</td>
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<tr>
<td></td>
<td>PETE 314</td>
<td>Transport Processes in Petroleum Production</td>
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<tr>
<td></td>
<td>PETE 335</td>
<td>Technical Presentations I</td>
</tr>
<tr>
<td></td>
<td>PETE 353</td>
<td>Petroleum Project Evaluation</td>
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<td>Semester Credit Hours</td>
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<td>Spring</td>
<td>PETE 321</td>
<td>Formation Evaluation</td>
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<td>PETE 323</td>
<td>Fundamentals of Reservoir Engineering</td>
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<tr>
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<td>PETE 324</td>
<td>Well Testing</td>
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<td>Petroleum Production Systems</td>
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<td></td>
<td>PETE 355</td>
<td>Drilling Engineering</td>
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<td>PETE 337</td>
<td>Junior Student Paper Contest</td>
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Fourth Year

<table>
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<th>Course Code</th>
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<tr>
<td>Fall</td>
<td>PETE 300</td>
<td>Summer Practice</td>
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<td>PETE 401</td>
<td>Reservoir Simulation</td>
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<td>PETE 404</td>
<td>Integrated Reservoir Modeling</td>
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<td></td>
<td>PETE 410</td>
<td>Production Engineering</td>
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<tr>
<td></td>
<td>PETE 435</td>
<td>Technical Presentations II</td>
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<td>Semester Credit Hours</td>
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<tr>
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<td>ENGR 482/PHIL 482</td>
<td>Ethics and Engineering</td>
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<td></td>
<td>PETE 402</td>
<td>Integrated Asset Development</td>
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<td>PETE 437</td>
<td>Senior Student Paper Contest</td>
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<td></td>
<td>Technical elective</td>
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</table>
See the Department of Petroleum Engineering (http://engineering.tamu.edu/petroleum) website for a list of approved courses.

Total Program Hours 128
Petroleum Engineering - Minor

The Department of Petroleum Engineering offers a minor in Petroleum Engineering.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>GEOL 104</td>
<td>Physical Geology</td>
<td>4</td>
</tr>
<tr>
<td>PETE 225</td>
<td>Introduction to Drilling Systems</td>
<td>3</td>
</tr>
<tr>
<td>PETE 310</td>
<td>Reservoir Fluids</td>
<td>4</td>
</tr>
<tr>
<td>PETE 311</td>
<td>Reservoir Petrophysics</td>
<td>4</td>
</tr>
<tr>
<td>PETE 325</td>
<td>Petroleum Production Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

Energy Engineering - Certificate

The objective of the Energy Engineering Certificate program is to better prepare undergraduate students to face the challenges of world energy supply and demand and how to ensure a sustainable energy future. The program will educate engineering majors and suitably prepared science majors about all energy sources, their development, generation, conversion, transmission, and use; with an emphasis on the importance of improving the standard of living for all people while at the same time preserving and improving the environment. To earn the Energy Engineering Certificate, a student must complete a minimum of 13 semester credit hours which includes one required course and three additional courses to be selected from a specified list. An overall GPA of 3.0 must be achieved to be awarded the certificate. Completion of the certificate will be recorded on the student’s University transcript.

For additional information, contact the Energy Engineering Certificate coordinator or Engineering Academic and Student Affairs, Engineering Activities Building B (EABB), (979) 845-7200.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Select one of the following: 4</td>
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</tr>
<tr>
<td>ENGR 101</td>
<td>Energy: Resources, Utilization and Importance to Society</td>
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</tr>
<tr>
<td>PETE 201</td>
<td>Introduction to Petroleum &amp; GEOG 201 Engineering and Introduction to Human Geography</td>
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</tr>
<tr>
<td>Select three of the following: 9</td>
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<td>ARCH 421</td>
<td>Energy and Sustainable Architecture</td>
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<tr>
<td>CHEN 455/ SENG 455</td>
<td>Process Safety Engineering</td>
<td></td>
</tr>
</tbody>
</table>
The College of Geosciences is home to four academic departments in these disciplines and interdisciplinary academic offerings in Environmental Programs and Water Management and Hydrological Sciences. The mission of the College of Geosciences is to advance new understandings of the Earth system and apply them to the needs of society, to prepare the next generation of geoscientists to conduct research, to find and develop natural resources, and to measure and respond to environmental change. In doing this, the College of Geosciences intends to lead in establishing the geosciences as the most important and impactful scientific discipline of the 21st century. To sustain human society into the future will depend more on the innovation and application of discovery in the geosciences than in other disciplines. The interdisciplinarity of our field is essential to solving today’s grand challenges—understanding global climate change, maintaining air and water quality, and producing adequate energy and food supplies for all people.

Geography studies humans and their interactions with the environment from a spatial perspective using a range of methods and geospatial technologies. As an interdisciplinary field, it synthesizes knowledge from the other geosciences as well as from the social and biological sciences. Geology deals with the processes and forces acting at the surface and within Earth: with the materials of Earth, its forms and structures, and with the history of its development and the evolution of life on its surface and in its waters. Geophysics focuses on the physics of solid Earth. This includes the measurement and understanding of its internal structure, physical properties, and plate motions and their effect on continents and ocean basins. It also includes the detection of natural resources through remote sensing. Atmospheric Sciences includes studies of weather/meteorology, climate and climate change, and air quality through the disciplines of atmospheric dynamics, atmospheric physics, and atmospheric chemistry. Oceanography is the study of the marine environment and its inhabitants. The distribution and nature of marine life, the development of ocean basins, the chemistry of ocean waters, and the dynamics of water masses are the major elements of Oceanography.

Atmospheric Sciences, Geography, Geology and Geophysics, and Oceanography offer BS, MS, and PhD degrees; a BA is also available in Geology. The College offers two interdisciplinary BS degrees through Environmental Programs: a BS in Environmental Studies and a BS in Environmental Geosciences. In addition, Geography offers a BS in Geographic Information Science and Technology and a BS in University Studies with a concentration in Geography. The College hosts a graduate program leading to an MS and PhD in Water Management and Hydrological Sciences.

College of Geosciences faculty members participate in research on a broad front of both basic and applied subjects. The College is the Science Operator for the International Ocean Discovery Program (http://iodp.tamu.edu), which is the largest geosciences research program in the world and explores the structure and history of sediments and crust beneath the sea floor. Other coordinated research programs in the College include the Geochemical and Environmental Research Group, the Center for Tectonophysics, Texas Sea Grant, the Berg-Hughes Center for Petroleum and Sedimentary Systems, the Center for Atmospheric Chemistry and the Environment, and the Texas Center for Climate Studies. Field work takes both faculty and students around the world to learn about the wide range of environments and processes affecting Earth and its inhabitants. Consequently, faculty bring to their classes the excitement of discovery, state-of-the-art scientific equipment, a knowledge of useful applications to human problems, and good working relations with industry and governments, all of which can help the undergraduate prepare for a rewarding career.

Career opportunities for graduates in the Geosciences are evolving dynamically—in industry, business, education and government at all levels. Geosciences professionals conduct research essential to understanding an increasingly unpredictable Earth; search for sustainable energy, mineral, and water resources; work to predict and mitigate natural hazards; contribute to wise environmental policy development and decision-making; and teach in high schools, colleges, and universities.

**Double Major**

Students in the College of Geosciences may elect to have two major fields of study within the College, or they may elect to have a major in the College of Geosciences in conjunction with a major in another college provided that both majors lead to the same baccalaureate degree; that is, both must lead to a BA or to a BS. Approval is required by the Associate Dean for Academic Affairs in the College of Geosciences, the current major department, and the proposed major department. Additional permissions may be required if a student elects a double major in two different colleges. Students seeking to double major must have a 3.0 overall GPA and a 3.0 in the current major at the time of application. Students pursuing a double major must:

1. satisfy all University and College requirements;
2. successfully complete departmental requirements in each major, if both majors are in the College of Geosciences; and
3. in cases where one major is in the College of Geosciences and the other is in another college, the student must successfully meet the major field of study requirements for each area as determined by each college.

**Minors**

Students may choose to complete a minor in the College of Geosciences. All minors will require not less than 15 hours and not more than 18 hours
in the discipline; at least 6 hours must be upper-division courses in the discipline. Each student choosing to complete a minor must contact the department offering the minor to determine if specific courses are required.

Change of Major and Transfer Students

Change of Major students are welcomed in the College of Geosciences. Students seeking entry from another major must be in good academic standing, meet approval of the Associate Dean and have shown interest in their new intended major by taking at least one course in the subject. To begin the Change of Major process, students should first contact the academic advisor in the department to which they wish to change. If the student meets minimum criteria, he or she will be referred to the Associate Dean for approval and processing.

Students are welcomed to transfer into the College of Geosciences from other universities and community colleges. Overall, the College of Geosciences requires a prospective student to have completed, or be in progress of completing, a minimum of 24 hours from a list of courses specific to each major outlined on page 56 of this catalog with a cumulative minimum GPA of 2.5. The College of Geosciences is also participating in the Program for Transfer Admission as well as the Program for System Admission in cooperation with Prairie View A&M University, Tarleton State University, Texas A&M International University, Texas A&M University-Commerce, Texas A&M University—Corpus Christi, Texas A&M University—Kingsville, West Texas A&M University and Texas A&M University–Texarkana.

Teacher Certification

The need for highly qualified teachers is high in the state of Texas. Students in the College of Geosciences are encouraged to consider pursuing a career in teaching. A number of pathways to certification are available. Interested students should consult with their advisors early in their programs and consult options outlined on the certification website. The college collaborates with the College of Science and the College of Education and Human Development on the aggieteach Program (http://aggieteach.tamu.edu) and in the University Studies degree program in secondary science teaching. Students in Geography may obtain composite social studies certification with a specialty in Geography through the Secondary Post-Baccalaureate Certification Program (8-12) or alternative certification options.

University Honors Programs

The College of Geosciences participates in the University Honors Programs, which is described in detail at Honors and Undergraduate Research (p. 103).

International and Cultural Diversity Requirement

Texas A&M University requires its students to meet an International and Cultural Diversity requirement as part of the Graduation requirements. Meeting this requirement will require the careful selection of courses. The student is directed to Requirements for a Baccalaureate Degree (p. 27) section of this catalog for detailed information regarding this requirement and is also encouraged to seek the advice of the student’s academic advisor.

Curricula — College of Geosciences

• Environmental Geosciences
• Environmental Studies
• Geographic Information Science and Technology
• Geography
• Geology
• Geophysics
• Meteorology
• Oceanography
• University Studies-Geography
• University Studies-GIST

Majors

College of Geosciences

• Bachelor of Science in Environmental Geoscience (p. 424)
• Bachelor of Science in Environmental Geoscience and Master of Ocean Science and Technology, 5-Year Degree Program (p. 428)
• Bachelor of Science in Environmental Studies (p. 429)

Atmospheric Sciences

• Bachelor of Science in Meteorology (p. 435)
• Bachelor of Science in Meteorology and Master of Ocean Science and Technology, 5-Year Degree Program (p. 436)

Geography

• Bachelor of Science in Geographic Information Science and Technology, Computation, Design and Analysis Track (p. 439)
• Bachelor of Science in Geographic Information Science and Technology, Earth Systems and Analysis Track (p. 441)
• Bachelor of Science in Geographic Information Science and Technology, Human Systems and Society Track (p. 443)
• Bachelor of Science in Geography (p. 445)
• Bachelor of Science in University Studies, Geographic Information Science and Technology Concentration (p. 448)
• Bachelor of Science in University Studies, Geography Concentration (p. 448)

Geology and Geophysics

• Bachelor of Arts in Geology (p. 451)
• Bachelor of Arts in Geology and Master of Ocean Science and Technology, 5-Year Degree Program (p. 453)
• Bachelor of Science in Geology (p. 454)
• Bachelor of Science in Geology and Master of Ocean Science and Technology, 5-Year Degree Program (p. 455)
• Bachelor of Science in Geophysics (p. 457)

Oceanography

• Bachelor of Science in Oceanography (p. 460)

Minors

College of Geosciences

• Climate Change Minor (p. 432)
• Earth Sciences Minor (p. 432)
• Environmental Geosciences Minor (p. 433)
The increasing demands that population growth and affluence put on the natural resources and the Earth's environment require greater numbers of trained professionals and informed citizens. The BS degree in Environmental Geosciences embraces all the disciplines of geosciences to give the student a rigorous interdisciplinary education including issues associated with environmental policy. The degree trains students for employment by industry, environmental and engineering consulting firms, non-governmental organizations, and governmental regulatory agencies, among other entities. Students focus coursework in a particular environmental theme: coastal and marine environments, water, human impact on the environment, climate change, or biosphere.

**Program Requirements**

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>GEOS 101</td>
<td>Introduction to the Geosciences</td>
</tr>
<tr>
<td>GEOS 105</td>
<td>Introduction to Environmental Geoscience</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<table>
<thead>
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<th>Spring</th>
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<tbody>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td></td>
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</table>

1. GEOS 101 can be waived with an A in GEOL 105.
2. Creative arts elective (p. 24) is required outside of the College of Geosciences but is included in the semester credit hours.
### Second Year

#### Fall

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>Weather and Climate</td>
<td>3</td>
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<tr>
<td>&amp; ATMO 202</td>
<td>and Weather and Climate Laboratory</td>
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<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
<td>3</td>
</tr>
<tr>
<td>&amp; GEOG 213</td>
<td>and Planet Earth Lab</td>
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</tr>
<tr>
<td>GEOL 101</td>
<td>Principles of Geology</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 251</td>
<td>Oceanography</td>
<td>4</td>
</tr>
<tr>
<td>&amp; OCNG 252</td>
<td>and Oceanography Laboratory</td>
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<tr>
<td>CHEM 101</td>
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<td>4</td>
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<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
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#### Semester Credit Hours

| Semester Credit Hours | 14 |

#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
<td>3</td>
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<tr>
<td>&amp; ATMO 202</td>
<td>and Weather and Climate Laboratory</td>
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<td>Planet Earth</td>
<td>3</td>
</tr>
<tr>
<td>&amp; GEOG 213</td>
<td>and Planet Earth Lab</td>
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<td>GEOL 101</td>
<td>Principles of Geology</td>
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<tr>
<td>OCNG 251</td>
<td>Oceanography</td>
<td>4</td>
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<tr>
<td>&amp; OCNG 252</td>
<td>and Oceanography Laboratory</td>
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</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>Communication elective (p. 22)</td>
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</table>

#### Semester Credit Hours

| Semester Credit Hours | 14 |

### Third Year

#### Fall

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<thead>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEOG 330</td>
<td>Resources and the Environment</td>
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</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 218</td>
<td>or Mechanics</td>
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</tr>
<tr>
<td>STAT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 211</td>
<td>or Principles of Statistics I</td>
<td></td>
</tr>
<tr>
<td>Environmental theme elective</td>
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<td></td>
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<tr>
<td>Technical elective</td>
<td>3</td>
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Select one of the following:

- ATMO 321 Computer Applications in the Atmospheric Sciences
- ATMO 441 Satellite Meteorology and Remote Sensing
- ATMO 464 Laboratory Methods in Atmospheric Sciences
- GEOG 312 Data Analysis in Geography
- GEOG 361 Remote Sensing in Geosciences
- GEOG 380 Workshop in Environmental Studies
- GEOG 450 Field Geography
- GEOG 462 Advanced GIS Analysis for Natural Resources Management
- GEOG 467 Dynamic Modeling of Earth and Environmental Systems

#### Semester Credit Hours

| Semester Credit Hours | 14 |

#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GEOG 390</td>
<td>Principles of Geographic Information Systems</td>
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<tr>
<td>GEO 420</td>
<td>Environmental Geology</td>
<td>3</td>
</tr>
<tr>
<td>American history elective (p. 25)</td>
<td>3</td>
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<tr>
<td>Environmental policy elective</td>
<td>3</td>
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Select one of the following:

- AGEC 350 Environmental and Natural Resource Economics
- BESC 367 U.S. Environmental Regulations
- ECON 202 Principles of Economics
- ECON 203 Principles of Economics
- ECON 323 Microeconomic Theory
- ECON 435 Economics of Resource Scarcity
- GEOG 304 Economic Geography
- GEOG 306 Introduction to Urban Geography
- GEOG 309 Geography of Energy
- GEOG 401 Political Geography
- GEOG 406 Geographic Perspectives on Contemporary Urban Issues
- GEOG 430 Environmental Justice
- PHIL 314 Environmental Ethics
- PLS 347 Politics of Energy and the Environment
- RENR 470 Environmental Impact Assessment
- SOCI 328 Environmental Sociology
- URPN 202 Building Better Cities
- URPN 360 Issues in Environmental Quality
- URPN 361 Urban Issues
- URPN 371 Environmental Health Planning and Policy
- URPN 460 Sustainable Communities

Environmental theme elective | 6       |

#### Semester Credit Hours

| Semester Credit Hours | 16 |

### Fourth Year

#### Fall

<table>
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<td>GEOS 470</td>
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<td>American history elective (p. 25)</td>
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Select one of the following:

- ATMO 321 Computer Applications in the Atmospheric Sciences
- ATMO 441 Satellite Meteorology and Remote Sensing
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<tr>
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<td>Satellite Meteorology and Remote Sensing</td>
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<td>ATMO 464</td>
<td>Laboratory Methods in Atmospheric Sciences</td>
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<td>GEOG 312</td>
<td>Data Analysis in Geography</td>
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<td>GEOG 361</td>
<td>Remote Sensing in Geosciences</td>
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<td>GEOG 380</td>
<td>Workshop in Environmental Studies</td>
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<tr>
<td>GEOG 450</td>
<td>Field Geography</td>
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<tr>
<td>GEOG 462/</td>
<td>Advanced GIS Analysis for Natural Resources Management</td>
</tr>
<tr>
<td>ESSM 462</td>
<td>Field Geography</td>
</tr>
<tr>
<td>GEOG 467</td>
<td>Dynamic Modeling of Earth and Environmental Systems</td>
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<tr>
<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
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<td>GEOG 476</td>
<td>GIS Practicum</td>
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<tr>
<td>GEOL 306</td>
<td>Sedimentology and Stratigraphy</td>
</tr>
<tr>
<td>GEOL 309</td>
<td>Introduction to Geological Field Methods</td>
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<tr>
<td>GEOL 330</td>
<td>Geologic Field Trips</td>
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<tr>
<td>GEOL 352/</td>
<td>GNSS in the Geosciences</td>
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<tr>
<td>GEOG 352</td>
<td>Advanced GIS Analysis for Natural Resources Management</td>
</tr>
<tr>
<td>GEOP 413</td>
<td>Near-surface Geophysics</td>
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<tr>
<td>OCNG 451</td>
<td>Mathematical Modeling of Ocean Climate</td>
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**Spring**

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<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
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<td>ECON 323</td>
<td>Microeconomic Theory</td>
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<td>ECON 435</td>
<td>Economics of Resource Scarcity</td>
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<td>GEOG 304</td>
<td>Economic Geography</td>
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<td>GEOG 306</td>
<td>Introduction to Urban Geography</td>
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<tr>
<td>GEOG 309</td>
<td>Geography of Energy</td>
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<td>GEOG 401</td>
<td>Political Geography</td>
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<td>GEOG 406</td>
<td>Geographic Perspectives on Contemporary Urban Issues</td>
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<td>GEOS 430</td>
<td>Global Science and Policy Making</td>
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<td>PHIL 314</td>
<td>Environmental Ethics</td>
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<td>POLS 347</td>
<td>Politics of Energy and the Environment</td>
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<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
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<td>SOCI 328</td>
<td>Environmental Sociology</td>
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<tr>
<td>URPN 202</td>
<td>Building Better Cities</td>
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<tr>
<td>URPN 360</td>
<td>Issues in Environmental Quality</td>
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<tr>
<td>URPN 361</td>
<td>Urban Issues</td>
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<tr>
<td>URPN 371</td>
<td>Environmental Health Planning and Policy</td>
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<td>URPN 460</td>
<td>Sustainable Communities</td>
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<td>GEOS 484</td>
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<tr>
<td>PHYS 218</td>
<td>Physical Geography</td>
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<tr>
<td>STAT 211</td>
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<td>GEOS 484</td>
<td>Environmental Geoscience</td>
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<tr>
<td>PHYS 218</td>
<td>Physical Geography</td>
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<td>STAT 211</td>
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<tr>
<td>GEOS 484</td>
<td>Environmental Geoscience</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 16

**Total Semester Credit Hours** 120

---

1. Freshmen entering the program take a first year seminar, GEOS 101. The choice is not restricted. Students transferring or changing majors into the program, who have not taken GEOS 101, are required to take GEOS 481 in their junior or senior year.

2. It is recommended to select a course that also fulfills an International and Cultural Diversity requirement.

3. Choose one introductory College of Geosciences course in the first semester and an additional one in the second semester of the sophomore year. Seek guidance from the academic advisor or faculty mentor.

4. PHYS 218 is recommended for the Coastal and Marine Environment Theme.

5. STAT 211 is recommended for the Coastal and Marine Environment Theme.

6. Choose 18 hours of theme courses in your junior and senior years in consultation with your academic advisor or faculty mentor from the list below.

7. Other courses which match the Environmental Programs’ technical electives definition will be allowed by adjustment. Guidance about technical electives (including the definition used by the Environmental Programs in Geosciences) can be found on the programs’ website. Seek guidance about choices from the ENVP academic advisor or faculty mentor.

8. GEG 390 is a required technical elective.

9. Seek guidance about choices from the ENVP academic advisor or faculty mentor.
Two courses in the degree plan must be writing intensive courses designated by the Environmental Programs in the schedule of classes. Also, international and cultural diversity electives (6 hours) must be incorporated into the degree.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
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<td></td>
<td><strong>Climate Change</strong></td>
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<tr>
<td>GEOS 210</td>
<td>Climate Change</td>
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<tr>
<td>GEOS 444</td>
<td>The Science and Politics of Global Climate Change</td>
<td>3</td>
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<tr>
<td>PHYS 202</td>
<td>College Physics</td>
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<tr>
<td>ATMO 324</td>
<td>Physical and Regional Climatology</td>
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<tr>
<td></td>
<td>or GEOG 324 or Global Climatic Regions</td>
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</tr>
<tr>
<td>ATMO 363</td>
<td>Introduction to Atmospheric Chemistry and Air Pollution</td>
<td>3</td>
</tr>
<tr>
<td>ATMO 463</td>
<td>Air Quality</td>
<td>3</td>
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<tr>
<td>GEOG 442/</td>
<td>Past Climates</td>
<td>3</td>
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<tr>
<td>GEOG 442</td>
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<td>GEOL 305</td>
<td>Paleobiology</td>
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<td>GEOL 306</td>
<td>Sedimentology and Stratigraphy</td>
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<td>GEOL 451</td>
<td>Introduction to Geochemistry</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 401</td>
<td>Polar Regions of the Earth: Science, Society and Discovery</td>
<td>3</td>
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<td>GEOS 410</td>
<td>Global Change</td>
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<tr>
<td>GEOS 442/</td>
<td>Past Climates</td>
<td>3</td>
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<td>GEOG 442</td>
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<tr>
<td>GEOG 484</td>
<td>Internship</td>
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<tr>
<td>OCNG 401</td>
<td>Interdisciplinary Oceanography ¹</td>
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<td>OCNG 410</td>
<td>Physical Oceanography</td>
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<td>OCNG 440</td>
<td>Chemical Oceanography</td>
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<td><strong>Coastal and Marine Environments</strong></td>
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<tr>
<td>GEOF 370/</td>
<td>Coastal Processes</td>
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<td>MARS 370</td>
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<td>Select the remaining courses from the following:</td>
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<tr>
<td>GEOG 331</td>
<td>Geomorphology</td>
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<tr>
<td>GEOG 360</td>
<td>Natural Hazards</td>
<td>3</td>
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<tr>
<td>GEOG 306</td>
<td>Sedimentology and Stratigraphy</td>
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<td>GEOG 440</td>
<td>Engineering Geology</td>
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<td>The Science and Politics of Global Climate Change</td>
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<td>Internship</td>
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<td>OCNG 350</td>
<td>Marine Pollution</td>
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<td>OCNG 420</td>
<td>Biological Oceanography</td>
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<td>OCNG 425</td>
<td>Microbial Oceanography</td>
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<td>OCNG 430</td>
<td>Geological Oceanography</td>
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<td>OCNG 440</td>
<td>Chemical Oceanography</td>
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<td>WFSC 418</td>
<td>Ecology of the Coastal Zone</td>
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<td>WFSC 425</td>
<td>Marine Fisheries</td>
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<td><strong>Human Impact on the Environment</strong></td>
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<td>GEOS 410</td>
<td>Global Change</td>
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<td>ATMO 363</td>
<td>Introduction to Atmospheric Chemistry and Air Pollution</td>
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</tr>
<tr>
<td>GEOS 309</td>
<td>Geography of Energy</td>
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<td>Natural Hazards</td>
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<td>GEOG 401</td>
<td>Political Geography</td>
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<td>Mineral Resources</td>
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<td>Hydrogeology</td>
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<td>GEOL 440</td>
<td>Engineering Geology</td>
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<td>GEOL 451</td>
<td>Introduction to Geochemistry</td>
<td>3</td>
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<td>GEOS 430</td>
<td>Global Science and Policy Making</td>
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<td>GEOS 444</td>
<td>The Science and Politics of Global Climate Change</td>
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</tr>
<tr>
<td>GEOS 484</td>
<td>Internship</td>
<td>6</td>
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<td>OCNG 350</td>
<td>Marine Pollution</td>
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<td>OCNG 401</td>
<td>Interdisciplinary Oceanography ¹</td>
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<td></td>
<td><strong>Water</strong></td>
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<td>GEOG 434</td>
<td>Hydrology and Environment</td>
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<td>Hydrogeology</td>
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<td>AGSM 335</td>
<td>Water and Soil Management</td>
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<td>AGSM 337</td>
<td>Technology for Environmental and Natural Resource Engineering</td>
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<td>ATMO 251</td>
<td>Weather Observation and Analysis</td>
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<td>ATMO 335</td>
<td>Atmospheric Thermodynamics</td>
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<td>ATMO 352</td>
<td>Severe Weather and Mesoscale Forecasting</td>
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<td>ATMO 443</td>
<td>Radar Meteorology</td>
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<td>Physical and Regional Climatology</td>
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<td>or GEOG 324 or Global Climatic Regions</td>
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<td>ESSM 301</td>
<td>Wildland Watershed Management</td>
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<td>ESSM 306</td>
<td>Plant Functional Ecology and Adaptation</td>
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<td>GEOG 331</td>
<td>Geomorphology</td>
<td>3</td>
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<td>GEOG 360</td>
<td>Natural Hazards</td>
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<td>GEOG 400</td>
<td>Arid Lands Geomorphology</td>
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<td>Engineering Geology</td>
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<td>GEOG 451</td>
<td>Introduction to Geochemistry</td>
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<td>GEOG 401</td>
<td>Polar Regions of the Earth: Science, Society and Discovery</td>
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<td>GEOS 484</td>
<td>Internship</td>
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<td>OCNG 350</td>
<td>Marine Pollution</td>
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</tr>
<tr>
<td>OCNG 401</td>
<td>Interdisciplinary Oceanography ¹</td>
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</table>
OCNG 425  Microbial Oceanography  3
OCNG 440  Chemical Oceanography  3
SCSC 455  Environmental Soil and Water Science  3
SCSC 458  Watershed, Water and Soil Quality Management  3

Select the remaining courses from the following:

BIOL 214  Genes, Ecology and Evolution  3
BIOL 357  Ecology  4
& BIOL 358  and Ecology Laboratory  3
GENE 302  Principles of Genetics  4
& GENE 312  and Comprehensive Genetics Laboratory  3
GEOG 435  Principles of Plant Geography  3
GEOG 442/  Past Climates  3
GEOS 442  3
GEOS 484  Internship  6
MEPS 316  Introduction to Theory and Practice of Plant Physiology  3
OCNG 401  Interdisciplinary Oceanography  3
OCNG 425  Microbial Oceanography  3
SCSC 301  Soil Science  4

1 Students who have taken OCNG 251 cannot take OCNG 401.

Two courses in the degree plan must be writing intensive courses designated by the Environmental Programs in the schedule of classes. Also, international and cultural diversity electives (6 hours) must be incorporated into the degree.

Environmental Geoscience - 5-Year Bachelor of Science/Master of Ocean Science and Technology

The Fast Track Program offers motivated and exceptional students the opportunity to achieve aspirations in an efficient program at Texas A&M, completing the Bachelor of Science (B.S.) degree in the Environmental Geoscience program and the Master of Ocean Science and Technology degree in 5 years. There will be only two courses used for dual credit in this program. There is a total of 150 hours of coursework. The concurrent degree program will enable these motivated students to coordinate the required B.S. coursework (120 undergraduate credit hours including 6 dual credit graduate hours) and Master of Ocean Science and Technology coursework (36 credit hours including the 6 dual credit graduate hours) to complete the required credit hours for each degree without diminishing scope or quality of work and within 5 years.

Application and Eligibility:

- Applications to the Fast Track program will be submitted by July 1 after the completion of the student's junior year. Applications submitted after that time will be evaluated on a case by case basis.
- Applicants must have a minimum undergraduate GPR of 3.0. Applicants should also earn a C or better in all Chemistry, Calculus and Physics courses. Once admitted to the program, students must maintain a minimum 3.0 GPR.
- A faculty advisor will be assigned to each student. Students may seek additional mentors, but a formal committee is not required.
- Students admitted into the Fast Track program must finish the entire 150 credit hours to obtain both the Bachelor's and Master's degrees. These students will be conferred with two degrees once they complete the 5th year of the concurrent program.
- Students admitted to the program will change from U4 to G7 status when they are admitted having completed at least 96 hours (end of spring semester, year 3).
- Students not accepted or not allowed to continue with the Fast Track Program will complete the 120 hour Bachelor’s degree under the standard 4 year curriculum. These students may still apply to the traditional graduate program.
- Students will graduate at the completion of the 5th year in the Fast Track Program coursework (150 credit hours) with both Bachelor’s and Master’s degrees. Students will complete the coursework in May of the 5th year.

Program Requirements

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>GEOS 105</td>
<td>Introduction to Environmental Geoscience</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology</td>
<td>4</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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</tr>
<tr>
<td>GEOS 101</td>
<td>Introduction to the Geosciences</td>
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Spring

<table>
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<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
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<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<tr>
<td>American history (p. 25)</td>
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</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
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</table>

Second Year

Fall

Select one of the following: 4

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
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</tbody>
</table>
& ATMO 202 | and Weather and Climate Laboratory | |
| GEOG 203 | Planet Earth | |
& GEOG 213 | and Planet Earth Lab | |
| GEOL 101 | Principles of Geology | |
| OCNG 251 | Oceanography | |
& OCNG 252 | and Oceanography Laboratory | |
| CHEM 101 | Fundamentals of Chemistry I | 4 |
& CHEM 111 | and Fundamentals of Chemistry Laboratory | |
Freshmen entering the program take a first year seminar, GEOS 101. The choice is not restricted. Students transferring or changing majors into the program, who have not taken GEOS 101, are required to take GEOS 481 in their junior or senior year.

It is recommended to select a course that also fulfills an International and Cultural Diversity (p. 40) requirement.

Select in consultation with advisor.

If students use nine credits of allowed OCNG courses (e.g. OCNG 401, OCNG 350, OCNG 451, OCNG 485) as Coastal and Marine Environments theme electives, they will receive an OCNG minor with their BS in ENGS degree. If one of the Introductory Geoscience course and associated labs listed in Year Two is OCNG 251 with OCNG 252, then only two (six credits) of the theme electives needs to be from OCNG to still get the minor.

Students will not be permitted to receive credit for both the 400- and 600-level versions of certain courses because the content and learning outcomes are too similar (e.g. OCNG 440/OCNG 640; GEOS 470/OCNG 655).

Two courses in the degree plan must be writing intensive courses designated by the Environmental Programs in the schedule of classes. Also, international and cultural diversity electives (6 hours) must be incorporated into the degree.

Any of the required courses may be taken during the summer sessions to diminish the heavy semester loads during Years 2 and 3.

Environmental Studies - BS

The increasing demands that population growth and affluence put on Earth's natural resources and environment require greater numbers of trained professionals and informed citizens. The Bachelor of Science degree in Environmental Studies blends an interdisciplinary understanding of Earth's surface processes and environmental problems, along with the policy and decision-making components of human
interactions with the environment. The degree is designed to educate students about the scientific, human-dimension and policy aspects of environmental issues facing our state and nation as they work in regulatory agencies, industry, and non-governmental organizations to resolve problems. Students focus upper division coursework in one of five environmental themes: 1) urban environment, 2) occupational health and safety, 3) environmental regulation and compliance, 4) Geographic Information Science and Technology (GIST), and 5) global environment.

### Program Requirements

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>Select one of the following:¹</td>
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<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
</tr>
<tr>
<td>&amp; ATMO 202</td>
<td>Weather and Climate Laboratory</td>
</tr>
<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
</tr>
<tr>
<td>&amp; GEOG 213</td>
<td>Planet Earth Lab</td>
</tr>
<tr>
<td>GEOL 101</td>
<td>Principles of Geology</td>
</tr>
<tr>
<td>&amp; GEOL 102</td>
<td>Principles of Geology Laboratory</td>
</tr>
<tr>
<td>OCNG 251</td>
<td>Oceanography</td>
</tr>
<tr>
<td>&amp; OCNG 252</td>
<td>Oceanography Laboratory</td>
</tr>
<tr>
<td>GEOS 105</td>
<td>Introduction to Environmental Geoscience</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

| Fall |  |
| Select one of the following:¹ | 4 |
| ATMO 201 | Weather and Climate |
| & ATMO 202 | Weather and Climate Laboratory |
| GEOG 203 | Planet Earth |
| & GEOG 213 | Planet Earth Lab |
| GEOL 101 | Principles of Geology |
| & GEOL 102 | Principles of Geology Laboratory |
| OCNG 251 | Oceanography |
| & OCNG 252 | Oceanography Laboratory |
| ENGL 104 | Composition and Rhetoric |
| GEOG 201 | Introduction to Human Geography |
| MATH 142 | Business Calculus |
| Creative arts elective (p. 24)² | 3 |
| **Semester Credit Hours** | **16** |

| Spring |  |
| Select one of the following:¹ | 4 |
| ATMO 201 | Weather and Climate |
| & ATMO 202 | Weather and Climate Laboratory |
| GEOG 203 | Planet Earth |
| & GEOG 213 | Planet Earth Lab |
| GEOL 101 | Principles of Geology |
| & GEOL 102 | Principles of Geology Laboratory |
| OCNG 251 | Oceanography |
| & OCNG 252 | Oceanography Laboratory |
| ENGL 104 | Composition and Rhetoric |
| GEOG 201 | Introduction to Human Geography |
| MATH 142 | Business Calculus |
| Creative arts elective (p. 24)² | 3 |
| **Semester Credit Hours** | **16** |

| Second Year |  |
| Fall |  |
| POLS 207 | State and Local Government |
| GEOS 210 | Climate Change |
| Communication elective (p. 22)³ | 3 |
| Life and physical sciences elective³ | 4 |
| Select one of the following: | |
| BIOL 101 | Botany |
| BIOL 107 | Zoology |
| BIOL 111 | Introductory Biology I |
| BIOL 112 | Introductory Biology II |
| **Semester Credit Hours** | **16** |

| Spring |  |
| Select one of the following:¹ | 4 |
| ATMO 201 | Weather and Climate |
| & ATMO 202 | Weather and Climate Laboratory |
| CHEM 102 | Fundamentals of Chemistry II |
| & CHEM 112 | Fundamentals of Chemistry Laboratory II |
| GEOS 205 | Environmental Geosciences Cornerstone |
| GEOS 484 | Internship |
| **Semester Credit Hours** | **16** |

**Third Year**

| Fall |  |
| GEOS 335 | Pattern and Process in Biogeography |
| PHIL 314 | Environmental Ethics |
| STAT 303 | Statistical Methods |
| GEG 380 | Workshop in Environmental Studies |
| Theme elective⁴ | 3 |
| **Semester Credit Hours** | **16** |

| Spring |  |
| GEOS 390 | Principles of Geographic Information Systems |
| AGEC 350 | Environmental and Natural Resource Economics |
| GEOS 444 | The Science and Politics of Global Climate Change |
| Environmental policy elective | 3 |
| Select one of the following: | |
| BESC 367 | U.S. Environmental Regulations |
| ECON 203 | Principles of Economics |
| ECON 323 | Microeconomic Theory |
| ECON 435 | Economics of Resource Scarcity |
| GEG 306 | Introduction to Urban Geography |
| GEG 309 | Geography of Energy |
| GEG 401 | Political Geography |
| GEG 406 | Geographic Perspectives on Contemporary Urban Issues |
| GEG 430 | Environmental Justice |
| **Semester Credit Hours** | **16** |

¹ Students must follow one of the following sets of courses.
² Students must complete a creative arts elective each semester.
³ Students must complete an upper-division course in a discipline other than English, mathematics, or science.
⁴ Students must complete a theme elective each semester.

<table>
<thead>
<tr>
<th>Course</th>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>GEG 380</td>
<td>Workshop in Environmental Studies</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 430</td>
<td>Environmental Justice</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 323</td>
<td>Microeconomic Theory</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 435</td>
<td>Economics of Resource Scarcity</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 306</td>
<td>Introduction to Urban Geography</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 309</td>
<td>Geography of Energy</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 401</td>
<td>Political Geography</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 406</td>
<td>Geographic Perspectives on Contemporary Urban Issues</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 430</td>
<td>Environmental Justice</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
POLS 347 Politics of Energy and the Environment
SOCI 328 Environmental Sociology
URPN 202 Building Better Cities
URPN 360 Issues in Environmental Quality
URPN 361 Urban Issues
URPN 371 Environmental Health Planning and Policy
URPN 460 Sustainable Communities
RENR 470 Environmental Impact Assessment
GEOS 431 Environmental Regulatory Compliance in Geoscience

Theme Elective 4

Semester Credit Hours 3

Fourth Year
Fall
GEOS 430 Global Science and Policy Making 3
American history elective (p. 25) 3
Theme elective 4 3
Technical elective 5 3
Select one of the following:
ATMO 321 Computer Applications in the Atmospheric Sciences
ATMO 464 Laboratory Methods in Atmospheric Sciences
GEOG 312 Data Analysis in Geography
GEOG 361 Remote Sensing in Geosciences
GEOG 450 Field Geography
GEOG 467 Dynamic Modeling of Earth and Environmental Systems
GEOG 475 Advanced Topics in GIS (Geographic Information Systems)
GEOL 309 Introduction to Geological Field Methods
GEOG 352/GEOL 352 GNSS in the Geosciences
GEOG 470 Data Analysis Methods in Geosciences

General elective 6

Semester Credit Hours 3

Spring
GEOS 405 Environmental Geosciences 3
Theme elective 4 3
General elective 6 3
American history elective (p. 25) 3

Semester Credit Hours 12

Total Semester Credit Hours 120

1 Choose one introductory College of Geosciences course in the first semester and an additional one in the second semester of the freshman year.
2 It is recommended to select a course that also fulfills an international and cultural diversity requirement.
3 Choose one Life and Physical Science Elective in the first semester and an additional one in the second semester of the sophomore year.
4 Choose 15 hours of courses in your chosen environmental theme from the list below.
5 Other courses which match the Environmental Programs’ technical electives definition will be allowed by adjustment. Seek guidance regarding potential adjustments from the ENVP academic advisor.
6 KINE 199, MATH 102, MATH 150, and lower level SOMS, NVSC, MLSC, and AERS courses cannot be used as general electives.

Two courses in the degree plan must be writing intensive courses designated by the Environmental Programs in the schedule of classes. Also, international and cultural diversity electives (6 hours) must be incorporated into the degree.

Environmental Theme Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 306</td>
<td>Introduction to Urban Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 406</td>
<td>Geographic Perspectives on Contemporary Urban Issues</td>
<td>3</td>
</tr>
<tr>
<td>or ATMO 326 Environmental Atmospheric Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URPN 202</td>
<td>Building Better Cities</td>
<td>3</td>
</tr>
<tr>
<td>URPN 361</td>
<td>Urban Issues</td>
<td>3</td>
</tr>
<tr>
<td>URPN 460</td>
<td>Sustainable Communities</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Urban Environment</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Occupational Health and Safety</strong></td>
<td></td>
</tr>
<tr>
<td>PHLT 330</td>
<td>The Environment and Public Health</td>
<td>3</td>
</tr>
<tr>
<td>Select the remaining courses from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHLT 331</td>
<td>Occupational Safety and Health I</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 333</td>
<td>Accident Investigation</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 334</td>
<td>Fire Safety and Workplace Hazards</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 335</td>
<td>Hazardous Materials</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 432</td>
<td>Human Factors and Ergonomic Health and Safety</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 434</td>
<td>Project Cost Benefit and Economics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Environmental Regulation and Compliance</strong></td>
<td></td>
</tr>
<tr>
<td>GEOS 431</td>
<td>Environmental Regulatory Compliance in Geoscience</td>
<td></td>
</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
<td>3</td>
</tr>
<tr>
<td>GEG 430</td>
<td>Environmental Justice</td>
<td>3</td>
</tr>
<tr>
<td>OCN 350</td>
<td>Marine Pollution</td>
<td>3</td>
</tr>
<tr>
<td>Choose the remaining courses from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEG 484</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>BESC 403</td>
<td>Sampling and Environmental Monitoring</td>
<td>3</td>
</tr>
<tr>
<td>BESC 411</td>
<td>Environmental Health and Safety Compliance</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Geographic Information Science and Technology (GIST)</strong></td>
<td></td>
</tr>
<tr>
<td>GEG 352/GEOL 352 GNSS in the Geosciences</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEG 361</td>
<td>Remote Sensing in Geosciences</td>
<td>4</td>
</tr>
<tr>
<td>Choose the remaining courses from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEG 392</td>
<td>GIS Programming</td>
<td>4</td>
</tr>
<tr>
<td>GEG 461</td>
<td>Digital Image Processing in the Geosciences</td>
<td>4</td>
</tr>
</tbody>
</table>

Texas A&M University Undergraduate Catalog 431
Climate Change - Minor

The College of Geosciences offers a minor in Climate Change. For specific program information, please reference the program requirements.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS 210</td>
<td>Climate Change</td>
<td>3</td>
</tr>
</tbody>
</table>

Select the remaining courses from the following:

- ATMO 201 Weather and Climate
- or GEOS 108 Introduction to Environmental Geoscience
- ATMO 324 Physical and Regional Climatology
- GEOG 309 Geography of Energy
- GEOG 324 Global Climatic Regions
- GEOG 442 Past Climates
- GEOS 442
- GEOS 401 Polar Regions of the Earth: Science, Society and Discovery
- GEOS 410 Global Change
- GEOS 444 The Science and Politics of Global Climate Change
- GEOS 481 Seminar

Total Semester Credit Hours 16

Students choosing to complete a minor in Climate Change must meet the following requirements:

- A minimum of 6 hours must be taken in residence at either Texas A&M University/College Station or Galveston.
- A minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.
- Take a minimum of 16 hours of coursework, of which 3 hours of GEOS 210 Climate Change are required.
- The remaining 13 hours must include at least 3 hours of 400-level coursework and another 3 hours of upper-level (300- or 400-level) coursework from the list.
- Students with majors in the College of Geosciences must select only courses outside of their home department.
- ENGS students may not select this minor.

Earth Sciences - Minor

The purpose of the Earth Sciences minor is to study the different physical earth processes and systems.

Students choosing to complete a minor in Earth Sciences must meet the following requirements:

- A minimum of 6 hours must be taken in residence at either Texas A&M University/College Station or Galveston.
- A minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.
- Take a minimum of 15 hours of coursework in the College of Geosciences.
- The 15 hours must include at least 3 hours of 400-level coursework and another 3 hours of upper-level (300- or 400-level) coursework from the list.
- Students with majors in the College of Geosciences must select only courses outside of their home department.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
<td>3</td>
</tr>
<tr>
<td>ATMO 202</td>
<td>Weather and Climate Laboratory</td>
<td></td>
</tr>
<tr>
<td>ATMO 324</td>
<td>Physical and Regional Climatology</td>
<td>3</td>
</tr>
<tr>
<td>ATMO 441</td>
<td>Satellite Meteorology and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 203</td>
<td>Planet Earth</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 309</td>
<td>Geography of Energy</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 324</td>
<td>Global Climatic Regions</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 331</td>
<td>Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 360</td>
<td>Natural Hazards</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 361</td>
<td>Remote Sensing in Geosciences</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 370</td>
<td>Coastal Processes</td>
<td>3</td>
</tr>
<tr>
<td>MARS 370</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 203</td>
<td>Past Climates</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 442</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GEOG 444</td>
<td>The Science and Politics of Global Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 481</td>
<td>Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

Select courses from at least three of the following five groups:

Group 1

- ATMO 201 Weather and Climate
- ATMO 202 Weather and Climate Laboratory
- ATMO 324 Physical and Regional Climatology
- ATMO 441 Satellite Meteorology and Remote Sensing

Group 2

- GEOG 203 Planet Earth
- GEOG 309 Geography of Energy
- GEOG 324 Global Climatic Regions
- GEOG 331 Geomorphology
- GEOG 360 Natural Hazards
- GEOG 361 Remote Sensing in Geosciences
- GEOG 370 Coastal Processes
- MARS 370

Students choosing to complete a minor in Earth Sciences must meet the following requirements:

- A minimum of 6 hours must be taken in residence at either Texas A&M University/College Station or Galveston.
- A minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.
- The remaining 15 hours must include at least 3 hours of 400-level coursework and another 3 hours of upper-level (300- or 400-level) coursework from the list.
- Students with majors in the College of Geosciences must select only courses outside of their home department.
- ENGS students may not select this minor.

Global Environment

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS 410</td>
<td>Global Change</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 350</td>
<td>Marine Pollution</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 324</td>
<td>Global Climatic Regions</td>
<td>3</td>
</tr>
</tbody>
</table>

Choose the remaining courses from the following:

- GEOG 309 Geography of Energy
- GEOG 400 Arid Lands Geomorphology
- GEOG 331 Geomorphology
- GEOG 360 Natural Hazards
- GEOG 435 Principles of Plant Geography
- ATMO 326 Environmental Atmospheric Science
**Group 3**
- GEOL 101 Principles of Geology or GEOL 104 or Physical Geology
- GEOL 203 Mineralogy
- GEOL 301 Mineral Resources
- GEOL 302 Introduction to Petrology
- GEOL 306 Sedimentology and Stratigraphy
- GEOL 308 Integrated Earth Science
- GEOL 312 Structural Geology and Tectonics
- GEOL 410 Hydrogeology
- GEOP 341 Fundamentals of Geophysics
- GEOP 413 Near-surface Geophysics

**Group 4**
- GEOS 401 Polar Regions of the Earth: Science, Society and Discovery
- GEOS 442/ GEOG 442 Past Climates
- GEOS 470 Data Analysis Methods in Geosciences

**Group 5**
- OCNG 251 Oceanography or OCNG 401 or Interdisciplinary Oceanography
- OCNG 252 Oceanography Laboratory
- OCNG 410 Physical Oceanography
- OCNG 425 Microbial Oceanography
- OCNG 430 Geological Oceanography
- OCNG 440 Chemical Oceanography

Total Semester Credit Hours: 15

At least 6 hours must be upper level, 3 of which must be 400 level.

Students with majors in the College of Geosciences must select only courses outside of their home department.

Some of the courses have prerequisites, so make sure to check the catalog before enrolling in the course.

ENGS and ENST students may not select this minor.

**Environmental Geosciences - Minor**

The purpose of the Environmental Geosciences minor is to study the environmental impacts on the different earth systems.

Students in the Environmental Programs are not allowed to declare Environmental Geosciences as a minor.

Students of other disciplines choosing to complete a minor in Environmental Geosciences must meet the following requirements:

- A minimum of 6 hours must be taken in residence at either Texas A&M University/College Station or Galveston.
- A minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.
- Take a minimum of 15 hours of coursework in the College of Geosciences, of which 3 hours of GEOS 105 is required.
- The remaining 12 hours must include at least 3 hours of 400-level coursework and another 3 hours of upper-level (300- or 400-level) coursework from the list.
- Students with majors in the College of Geosciences must select only courses outside of their home department.

**Program Requirements**

Some of the courses have prerequisites so make sure to check the catalog before enrolling in the course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOS 105</td>
<td>Introduction to Environmental Geoscience</td>
<td>3</td>
</tr>
</tbody>
</table>

Select remaining courses from at least three of the following five groups.  

**Group 1**
- ATMO 326 Environmental Atmospheric Science
- ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution
- ATMO 463 Air Quality
- ATMO 464 Laboratory Methods in Atmospheric Sciences

**Group 2**
- GEOG 205 Environmental Change
- GEOG 309 Geography of Energy
- GEOG 330 Resources and the Environment
- GEOG 380 Workshop in Environmental Studies
- GEOG 430 Environmental Justice
- GEOG 467 Dynamic Modeling of Earth and Environmental Systems

**Group 3**
- GEOL 410 Hydrogeology
- GEOL 420 Environmental Geology
- GEOL 451 Introduction to Geochemistry

**Group 4**
- GEOS 210 Climate Change
- GEOS 410 Global Change
- GEOS 430 Global Science and Policy Making
- GEOS 444 The Science and Politics of Global Climate Change

**Group 5**
- OCNG 350 Marine Pollution
- OCNG 420 Biological Oceanography
- OCNG 440 Chemical Oceanography

Total Semester Credit Hours: 15

1 At least 6 hours must be upper level, 3 of which must be 400 level.

ENGS and ENST majors may not select this minor.
Diversity - Certificate

The College of Geosciences, in collaboration with the Department of Multicultural Services, offers a Diversity Certificate program for Geosciences majors. The goal of the program is two-fold:

1. to offer Geosciences students an opportunity to synthesize and integrate academic coursework with co-curricular and service learning experiences to demonstrate their preparedness to participate successfully in contemporary, highly diverse global societies; and
2. to promote diversity, multiculturalism, and internationalism in the College of Geosciences.

Program Requirements

Certificate requirements include nine semester hours of diversity-related courses, at least one of which must be from the College of Geosciences, and completion of a special section of GEOS 484 to fulfill the co-curricular, service learning and capstone component of the certificate. Students are encouraged to build the coursework into their degree plans as much as possible through careful planning. Information on the program is available from the Associate Dean for Academic Affairs, Room 202 Eller O&M Building and departmental academic advisors.

Department of Atmospheric Sciences

Students in the Department of Atmospheric Sciences enjoy low student-to-teacher ratios and small classes. Undergraduates have opportunities for individual study and for participation in faculty research projects, including regional, national and international field programs.

Faculty

Bowman, Kenneth P, Professor
Atmospheric Sciences
PHD, Princeton University, 1984

Brooks, Sarah D, Professor
Atmospheric Sciences
PHD, University of Colorado, 2002

Collins, Donald R, Professor
Atmospheric Sciences
PHD, California Institute of Technology, 2000

Conlee, Don T, Instructional Professor
Atmospheric Sciences
PHD, Texas A&M University, 1994

Dessler, Andrew E, Professor
Atmospheric Sciences
PHD, Harvard University, 1994

Epifanio, Craig C, Associate Professor
Atmospheric Sciences
PHD, University of Washington, 1999

Korty, Robert L, Associate Professor
Atmospheric Sciences
PHD, Massachusetts Institute of Technology, 2005

Lemmon, Mark T, Associate Professor
Atmospheric Sciences
PHD, University of Arizona, 1994

Logan, Timothy S, Professor
Atmospheric Sciences
PHD, University of North Dakota, 2014

Nielsen-Gammon, John W, Professor
Atmospheric Sciences
PHD, Massachusetts Institute of Technology, 1990

North, Jerry R, Research Professor
Atmospheric Sciences
PHD, University of Wisconsin - Madison, 1966

Nowotarski, Christopher J, Assistant Professor
Atmospheric Sciences
PHD, The Pennsylvania State University, 2013

Orville, Richard E, Research Professor
Atmospheric Sciences
PHD, University of Arizona, 1966

Panetta, Richard L, Professor
Atmospheric Sciences
PHD, University of Wisconsin - Madison, 1978

Rapp, Anita D, Assistant Professor
Atmospheric Sciences
PHD, Colorado State University, 2008

Saravanan, Ramalingam, Professor
Atmospheric Sciences
PHD, Princeton University, 1990

Schade, Gunnar W, Associate Professor
Atmospheric Sciences
PHD, Johannes Gutenberg Universitat, Germany, 1997

Schumacher, Courtney, Professor
Atmospheric Sciences
PHD, University of Washington, 2003

Szunyogh, Istvan, Professor
Atmospheric Sciences
PHD, Hungarian Academy of Sciences, 1994

Xu, Yangyang, Associate Professor
Atmospheric Sciences
PHD, University of California, San Diego, 2014

Yang, Ping, Professor
Atmospheric Sciences
PHD, University of Utah, 1995

Zhang, Renyi, Professor
Atmospheric Sciences
PHD, Massachusetts Institute of Technology, 1994

Majors

• Bachelor of Science in Meteorology (p. 435)
• Bachelor of Science in Meteorology and Master of Ocean Science and Technology, 5-Year Degree Program (p. 436)

Minors

• Meteorology Minor (p. 438)
Facilities
The Department of Atmospheric Sciences occupies the upper floors of the 15-story Oceanography and Meteorology Building. The Doppler weather radar on the roof of the building is a campus landmark and is used for both research and teaching. The department also operates a mobile Doppler radar for use in research projects. The department has four state-of-the-art chemistry labs, in which phenomena from ozone to aerosols are studied, as well as facilities for modeling the chemical environment. A continuous, comprehensive stream of meteorological data is received from ground stations, balloons, aircraft, radars, and satellites around the world. Two well-equipped computer labs are regularly upgraded to provide state-of-the-art educational equipment.

Meteorology - BS
The Department of Atmospheric Sciences offers the Bachelor of Science degree in Meteorology. The undergraduate curriculum in meteorology emphasizes weather and weather forecasting, but also includes courses in climatology, atmospheric chemistry, cloud physics and remote sensing of the atmosphere with radar and satellites. As the curriculum makes clear, the study of these subjects relies on a foundation of physics, chemistry and mathematics. The atmospheric sciences also have close connections to oceanography and hydrology.

Students who receive BS degrees in Meteorology often obtain employment with the National Weather Service, private meteorological consulting and weather forecasting companies, air quality consulting firms, airlines, TV stations, energy trading companies, universities, state governments, agricultural firms and computer-related industries. Some students choose to enter the military services as weather officers. Positions in teaching and research normally require a graduate degree.

Students interested in cooperative educational arrangements and internships should contact the department’s academic advisor for information.

In the curriculum presented, students are advised to note carefully the prerequisites for many of the courses.

Program Requirements

First Year
Fall
ATMO 201 Weather and Climate 3
CHEM 101 Fundamentals of Chemistry I 4
& CHEM 111 and Fundamentals of Chemistry Laboratory I 4
ENGL 104 Composition and Rhetoric 3
MATH 151 Engineering Mathematics I 4
or MATH 171 or Analytic Geometry and Calculus 4
Semester Credit Hours 14

Spring
ATMO 202 Weather Forecasting Laboratory 1
CHEM 102 Fundamentals of Chemistry II 4
& CHEM 112 and Fundamentals of Chemistry Laboratory II 4
MATH 152 Engineering Mathematics II 4
or MATH 172 or Calculus 4
Semester Credit Hours 13

Second Year
Fall
ATMO 251 Weather Observation and Analysis 3
ATMO 321 or CSCE 206 Computer Applications in the Atmospheric Sciences or Structured Programming in C 3
ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution 3
MATH 251 Engineering Mathematics III 3
Select one of the following: 3
American history (p. 25)
Government/political science (p. 25)
Semester Credit Hours 15

Spring
ATMO 324 Physical and Regional Climatology 3
MATH 308 Differential Equations 3
PHYS 210 Electricity and Optics 4
Select one of the following: 3
American history (p. 25)
Government/political science (p. 25)
General Elective 3
Semester Credit Hours 16

Third Year
Fall
ATMO 335 Atmospheric Thermodynamics 3
ATMO 336 Atmospheric Dynamics 4
STAT 211 Principles of Statistics I 3
Select one of the following: 3
American history (p. 25)
Government/political science (p. 25)
Atmospheric sciences or tech. elective (p. 733) 3
Semester Credit Hours 14

Spring
ATMO 435 Synoptic-Dynamic Meteorology 3
Atmospheric sciences or tech. electives (p. 733) 3
COMM 203 or COMM 205 Public Speaking or Communication for Technical Professions 3
Language, philosophy and culture elective (p. 23) 3
Semester Credit Hours 16

Fourth Year
Fall
ATMO 446 Physical Meteorology 3
ATMO 441 Satellite Meteorology and Remote Sensing or Radar Meteorology 3
Atmospheric sciences or tech. electives (p. 733) 3
General elective 3
Semester Credit Hours 15
Program Requirements

First Year

| Semester Credit Hours | 
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| **Fall**              | **Spring**            | **Total Semester Credit Hours** |
| ATMO 201              | Weather and Climate  | 3                     | 3                     | 6                     |
| CHEM 101 & CHEM 111   | Fundamentals of Chemistry I | 4                   | 4                   | 8                     |
| MATH 171 or MATH 151  | Analytic Geometry and Calculus I or Engineering Mathematics I | 4                   | 4                   | 8                     |
| ENGL 104              | Composition and Rhetoric | 3                   | 3                   | 6                     |
| Technical elective 2  |                       | 4                   | 4                   | 8                     |

| Semester Credit Hours | 
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| **Spring**            | **Fall**              | **Second Year**       | **Total Semester Credit Hours** |
| ATMO 203              | Weather Forecasting Laboratory | 1                   | 1                   | 2                     |
| CHEM 102 & CHEM 112   | Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II | 4                   | 4                   | 8                     |
| MATH 172 or MATH 152  | Calculus I or Engineering Mathematics II | 4                   | 4                   | 8                     |
| PHYS 218              | Mechanics             | 4                   | 4                   | 8                     |
| Select one of the following: | 3                   | 3                   | 3                   | 6                     |
| American history (p. 25) |                        | 3                   | 3                   | 6                     |
| Government/Political science (p. 25) |                        | 3                   | 3                   | 6                     |

Second Year

| Semester Credit Hours | 
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| **Fall**              | **Spring**            | **Total Semester Credit Hours** |
| ATMO 251              | Weather Observation and Analysis | 3                   | 3                   | 6                     |
| ATMO 363              | Introduction to Atmospheric Chemistry and Air Pollution | 3                   | 3                   | 6                     |
| MATH 251              | Engineering Mathematics III | 3                   | 3                   | 6                     |
| ATMO 321 or CSCE 206  | Computer Applications in the Atmospheric Sciences or Structured Programming in C | 3                   | 3                   | 6                     |
| Select one of the following: | 3                   | 3                   | 3                   | 6                     |
| American history (p. 25) |                        | 3                   | 3                   | 6                     |

Application and Eligibility

- Applications to the Fast Track program will be submitted by July 1 after the completion of the student’s junior year. Applications submitted after that time will be evaluated on a case by case basis.

- Applicants must have a minimum undergraduate GPR of 3.0. Applicants should also earn a C or better in all Chemistry, Calculus and Physics courses. Once admitted to the program, students must maintain a minimum 3.0 GPR.

- A faculty advisor will be assigned to each student. Students may seek additional mentors, but a formal committee is not required.

- Students admitted into the Fast Track program must finish the entire 150 credit hours to obtain both the Bachelor’s and Master’s degrees. These students will be conferred with two degrees once they complete the 5th year of the concurrent program.

- Students admitted to the program will change from U4 to G7 status when they are admitted having completed at least 99 hours (end of spring semester, year 3).

- Students not accepted or not allowed to continue with the Fast Track Program will complete the 120 hour Bachelor’s degree under the standard 4 year curriculum. These students may still apply to the traditional graduate program.

- Students will graduate at the completion of the 5th year in the Fast Track Program coursework (150 credit hours) with both Bachelor’s and Master’s degrees. Students will complete the coursework in May of the 5th year.
<table>
<thead>
<tr>
<th>Sem</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>ATMO 335</td>
<td>Atmospheric Thermodynamics</td>
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<td>ATMO 336</td>
<td>Atmospheric Dynamics</td>
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<td>STAT 211</td>
<td>Principles of Statistics</td>
<td>3</td>
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<td><strong>Third Year</strong></td>
<td>ATMO 435</td>
<td>Synoptic-Dynamic Meteorology</td>
<td>3</td>
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<tr>
<td></td>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<td></td>
<td>or COMM 205</td>
<td>or Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
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<td>Technical elective</td>
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<tr>
<td></td>
<td></td>
<td>Language, philosophy and culture elective (p. 23)</td>
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<tr>
<td><strong>Fourth Year</strong></td>
<td>OCNG 604</td>
<td>Ocean Observing Systems</td>
<td>3</td>
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<td>OCNG 608</td>
<td>Physical Oceanography</td>
<td>3</td>
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<td>Select one of the following:</td>
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<td></td>
<td>Technical elective</td>
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<tr>
<td></td>
<td></td>
<td>Creative arts elective (p. 24)</td>
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<tr>
<td><strong>Fall</strong></td>
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<td>Physical Meteorology</td>
<td>3</td>
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<tr>
<td></td>
<td>ATMO 441</td>
<td>Satellite Meteorology and Remote Sensing</td>
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</tr>
<tr>
<td></td>
<td>or ATMO 443</td>
<td>or Radar Meteorology</td>
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<tr>
<td></td>
<td>OCNG 604</td>
<td>Ocean Observing Systems</td>
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<tr>
<td></td>
<td>OCNG 608</td>
<td>Physical Oceanography</td>
<td>3</td>
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<tr>
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<td>Select one of the following:</td>
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<td></td>
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<tr>
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<td>Select one of the following:</td>
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<td></td>
<td>OCNG 620 Biological Oceanography</td>
<td>3</td>
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<tr>
<td></td>
<td>OCNG 630</td>
<td>Geological Oceanography</td>
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<tr>
<td></td>
<td>OCNG 640</td>
<td>Chemical Oceanography</td>
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<td></td>
<td></td>
<td>Technical elective</td>
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<tr>
<td></td>
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<td></td>
<td>OCNG 603 Communicating Ocean Science</td>
<td>3</td>
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<td></td>
<td>OCNG 657</td>
<td>Data Methods and Graphical Representation in Oceanography</td>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>OCNG 603</td>
<td>Communicating Ocean Science</td>
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<tr>
<td></td>
<td>OCNG 657</td>
<td>Data Methods and Graphical Representation in Oceanography</td>
<td>3</td>
</tr>
</tbody>
</table>

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1. A grade of C or better is required.
2. General electives may not include CAEN 101-499; CAEX 101-499; DEVS 101-499; ENGL 103; KINE 198-199 (p. 861); MATH 102, MATH 131, MATH 141-142 (p. 885), MATH 150-152 (p. 885), MATH 171-172 (p. 885), MATH 221, MATH 251, MATH 253; PHYS 101, PHYS 201-202 (p. 933), PHYS 208, PHYS 218-219 (p. 933); AERS 100-499 (p. 702); MLSC 100-499 (p. 900); NVSC 100-499 (p. 918); SOMS 100-499. (p. 964)
3. GEOS 101 recommended.
4. Students must complete 6 credit hours of American history and 6 credit hours of government/political science.
5. MLSC, NVSC and AERS courses can be used as general electives if a minor is completed in Military Science. See an academic advisor for more information.
6. All students enter as Lower Level Meterology (METL) until completion of ATMO 335 and ATMO 336 and the associated prerequisite courses. Once students have completed these courses, their major will be changed to Upper Level Meterology (METR), and they will be eligible to take upper-level electives. This change should occur following Fall of the junior year.
7. Select in consultation with faculty academic advisor.
8. If students use nine credits of allowed OCNG courses (e.g. OCNG 251 or OCNG 401, OCNG 252, OCNG 350, OCNG 451,OCNG 485) as technical electives and general electives, they will receive an OCNG minor with their BS in METR degree.
9. Students will not be permitted to receive credit for both the 400- and 600-level versions of certain courses because the content and learning outcomes are too similar (e.g. OCNG 440/OCNG 640).
10. Two graduate courses will be taken for dual undergraduate/graduate credit and will contribute to the minor and technical electives.
Meteorology - Minor

Students of other disciplines, such as chemistry or mathematics, may complete a minor in meteorology by taking a minimum of 16 hours in Atmospheric Sciences or upper division geosciences. GEOS courses may comprise no more than 6 of these hours, with the remainder being ATMO. At least 9 of the 16 hours must be in courses 300-level or above, including at least three 400-level hours. The selection of courses must be made in agreement with an advisor from the Atmospheric Sciences faculty.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>300-level requirement</strong></td>
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<tr>
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<td>Select from the following:</td>
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<tr>
<td></td>
<td>ATMO 300 to 399 (p. 733)</td>
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<tr>
<td></td>
<td>GEOS 300 to 399 (p. 830)</td>
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<tr>
<td></td>
<td><strong>400-level requirement</strong></td>
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<tr>
<td></td>
<td>Select from the following:</td>
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<tr>
<td></td>
<td>ATMO 400 to 499 (p. 733)</td>
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<tr>
<td></td>
<td>GEOS 400 to 499 (p. 830)</td>
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<td><strong>Electives</strong></td>
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<td>ATMO 100 to 499 (p. 733)</td>
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<tr>
<td></td>
<td>GEOS 300 to 499 (p. 830)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Semester Credit Hours</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

Must maintain a minimum GPR of 2.000 in order to pursue this minor.

At least 9 hours of ATMO courses are required and a minimum of 3 hours at the 400 level.

Department of Geography

Geography is the study of the relationships between people and their environment, relationships that vary from place to place over the Earth. Geography students assess those factors responsible for the variable and changing character of Earth’s systems, which over time have been transformed into human habitat. Geography integrates physical science, social science, and the humanities. The Department requires that students understand both the physical and human components, and develop the spatial analytical skills to study these systems.

Physical geography emphasizes a systematic and interdisciplinary approach to the study of landforms, climate, soils, and vegetation. Human geography seeks to describe and explain the spatial patterns of human activities on Earth. These range from economic activities such as the distribution of retail sales and industrial production to cultural landscapes, which often have strong historical roots. Geographic Information Science (GIS), quantitative methods, and remote sensing provide geographers with the analytical techniques to study spatial phenomena.

Faculty

Bishop, Michael P, Professor
Geography
PHD, Indiana State University, 1987

Brannstrom, Christian, Professor
Geography
PHD, University of Wisconsin - Madison, 1998

Caims, David M, Professor
Geography
PHD, University of Iowa, 1995

Filippi, Anthony M, Associate Professor
Geography
PHD, University of South Carolina, 2003

Frauenfeld, Oliver W, Associate Professor
Geography
PHD, University of Virginia, 2003

Goldberg, Daniel W, Assistant Professor
Geography
PHD, University of Southern California, 2010

Guneralp, Burak, Research Assistant Professor
Geography
PHD, University of Illinois at Urbana-Champaign, 2006

Guneralp, Inci, Associate Professor
Geography
PHD, University of Illinois at Urbana-Champaign, 2007

Jepson, Wendy E, Professor
Geography
PHD, University of California, Los Angeles, 2003

Loisel, Julie, Assistant Professor
Geography
PHD, Texas A&M University, 2016

Klein, Andrew G, Professor
Geography
PHD, Cornell University, 1997

Lafon, Charles W, Professor
Geography
PHD, University of Tennessee, 2000

Lauermann, John A, Visiting Assistant Professor
Geography
PHD, Clark University, 2016

Loisel, Julie, Assistant Professor
Geography
PHD, Lehigh University, 2012

O'Reilly, Kathleen M, Associate Professor
Geography
PHD, University of Iowa, 2002

Patzwitsch, Wendy W, Instructional Assistant Professor
Geography
PHD, Texas A&M University, 2007

Prout, Erik, Instructional Associate Professor
Geography
PHD, Louisiana State University, 2001
Ritz, Thor M, Visiting Assistant Professor
Geography
PHD, Syracuse University, 2016

Roark, Erin B, Associate Professor
Geography
PHD, University of California, Berkeley, 2005

Smith, Jonathan, Professor
Geography
PHD, Syracuse University, 1991

Tchakerian, Vatche P, Professor
Geography
PHD, University of California, Los Angeles, 1989

Majors

• Bachelor of Science in Geographic Information Science and Technology - Computation, Design and Analysis Track (p. 439)
• Bachelor of Science in Geographic Information Science and Technology - Earth Systems Analysis Track (p. 441)
• Bachelor of Science in Geographic Information Science and Technology - Human Systems and Society Track (p. 443)
• Bachelor of Science in Geography (p. 445)
• Bachelor of Science in University Studies, Geographic Information Science and Technology Concentration (p. 448)

Minors

• Geographic Information Science and Technology Minor (p. 451)
• Geography Minor (p. 450)

Geographic Information Science and Technology - BS, Computation, Design and Analysis Track

The BS in Geographic Information Science and Technology (GIST) requires semester credit hours for completion in the Computation, Design, and Analysis (CDA), Earth Systems Analysis (ESA), or the Human Systems and Society (HSS) tracks.

The Computation, Design, and Analysis (CDA) track is intended for students interested in the computational, analysis, and software development aspects of GIST. This track emphasizes the computational and information technology that underpins GIST and focuses on technical issues, algorithm development and performance, and software tool development.

Students will receive a rigorous and modern-day education and training in GIST with application knowledge in physical and human geography. Employers require problem solvers, not button pushers, to address problems in various application domains. The BS in GIST is designed to:

• Produce high-quality geographers with strong GIST knowledge and skills

Geospatial technology graduates are in extremely high demand and according to the US Department of Labor (USDLL), are one of the highest growth areas in the federal government, particularly in homeland security activities, as well as in energy, software and engineering firms, and biomedical and biohazard research, among many others. A 35% annual rate of growth in Geospatial Technology related degrees are projected by the United States Department of Labor. Specifically, students have employment opportunities with the following corporate and government entities:

• Government agencies (federal, state, county, and city): management and planning of urban infrastructure, inventory and assessment of natural resources including agriculture, forestry, and water resources.
• Energy industry: assessing biofuel production and identifying locations suitable for renewable energy resources and mineral exploration.
• Health science industry: determine hotspots of health events and explore causative influences.
• Military and intelligence community: numerous opportunities exist in military branches, and agencies such as the Central Intelligence Agency, National Security Agency, and other intelligence organizations.
• Commercial industries: business analytics and marketing, as spatial information can be used to target marketing campaigns, and suitable site assessment to locate companies.
• Geospatial industries: software development, geotechnical engineering, and technology development.

Students select courses with the assistance of faculty advisors and academic advisor in an individualized advising system.

Program Requirements

First Year
Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 22</td>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 213</td>
<td>Planet Earth Lab</td>
<td>1</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences</td>
<td>4</td>
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<tr>
<td>BIOL 101</td>
<td>Botany</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td></td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>GEOL 101</td>
<td>Principles of Geology</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
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<td>ATMO 201 &amp; ATMO 202</td>
<td>Weather and Climate and Weather and Climate Laboratory</td>
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<td>Semester Credit Hours</td>
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Spring

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<tr>
<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
<td>3</td>
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<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
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</table>
**Geographic Information Science and Technology - BS, Computation, Design and Analysis Track**

### First Year

<table>
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<th>Semester</th>
<th>Courses</th>
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<tbody>
<tr>
<td>Fall</td>
<td>GEOG 232 Cartography and Visualization 3</td>
</tr>
<tr>
<td>Spring</td>
<td>GEOG 306 Introduction to Geographic Information Systems 4</td>
</tr>
<tr>
<td>Fall</td>
<td>GEOG 335 Pattern and Process in Biogeography 3</td>
</tr>
<tr>
<td>Spring</td>
<td>GEOG 345 Advanced Topics in GIS (Geographic Information Systems) 3</td>
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### Second Year

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<tr>
<td>Fall</td>
<td>GEOG 232 Cartography and Visualization 3</td>
</tr>
<tr>
<td>Spring</td>
<td>GEOG 306 Introduction to Geographic Information Systems 4</td>
</tr>
<tr>
<td>Fall</td>
<td>GEOG 335 Pattern and Process in Biogeography 3</td>
</tr>
<tr>
<td>Spring</td>
<td>GEOG 345 Advanced Topics in GIS (Geographic Information Systems) 3</td>
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### Third Year

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<th>Semester</th>
<th>Courses</th>
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</tr>
<tr>
<td>Spring</td>
<td>GEOG 306 Introduction to Geographic Information Systems 4</td>
</tr>
<tr>
<td>Fall</td>
<td>GEOG 335 Pattern and Process in Biogeography 3</td>
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<tr>
<td>Spring</td>
<td>GEOG 345 Advanced Topics in GIS (Geographic Information Systems) 3</td>
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### Fourth Year

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<tr>
<td>Spring</td>
<td>GEOG 306 Introduction to Geographic Information Systems 4</td>
</tr>
<tr>
<td>Fall</td>
<td>GEOG 335 Pattern and Process in Biogeography 3</td>
</tr>
<tr>
<td>Spring</td>
<td>GEOG 345 Advanced Topics in GIS (Geographic Information Systems) 3</td>
</tr>
</tbody>
</table>

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1. Department requires that you take two in the same discipline to meet this requirement.

3. Track electives comprise 6 hours of focused coursework. The track and specific courses within the track are to be chosen in consultation with the advisor and/or faculty mentor.

Two courses in the degree plan must be Writing Intensive courses designated by the department in the schedule of classes. Also, International and Cultural Diversity Electives (6 hours) must be incorporated into the degree.
Geographic Information Science and Technology - BS, Earth Systems Analysis Track

The BS in Geographic Information Science and Technology (GIST) requires semester credit hours for completion in the Computation, Design, and Analysis (CDA), Earth Systems Analysis (ESA), or the Human Systems and Society (HSS) tracks.

The Earth Systems and Analysis (ESA) track is designed to attract students interested in applying GIST to physical geography. It applies geospatial technologies to the study of the Geosciences and assessing the Earth’s natural resources by providing students with a foundation in biogeography, climate, geomorphology, soil science, geology, ecosystem science, as well as a strong grounding in GIST.

Students will receive a rigorous and modern-day education and training in GIST with application knowledge in physical and human geography. Employers require problem solvers, not button pushers, to address problems in various application domains. The BS in GIST is designed to:

- Provide modern-day exposure to the rapidly changing field of GIST
- Balance education and training with a focus on competency
- Provide application and problem-solving experiences
- Support student activities and research
- Provide students with professional experience
- Produce high-quality geographers with strong GIST knowledge and skills

Geospatial technology graduates are in extremely high demand and according to the US Department of Labor (USDL), are one of the highest growth areas in the federal government, particularly in homeland security activities, as well as in energy, software and engineering firms, and biomedical and biohazard research, among many others. A 35% annual rate of growth in Geospatial Technology related degrees are projected by the United States Department of Labor. Specifically, students have employment opportunities with the following corporate and government entities:

- Government agencies (federal, state, county, and city): management and planning of urban infrastructure, inventory and assessment of natural resources including agriculture, forestry, and water resources.
- Energy industry: assessing biofuel production and identifying locations suitable for renewable energy resources and mineral exploration.
- Health science industry: determine hotspots of health events and explore causative influences.
- Military and intelligence community: numerous opportunities exist in military branches, and agencies such as the Central Intelligence Agency, National Security Agency, and other intelligence organizations.
- Commercial industries: business analytics and marketing, as spatial information can be used to target marketing campaigns, and suitable site assessment to locate companies.
- Geospatial industries: software development, geotechnical engineering, and technology development.

Students select courses with the assistance of faculty advisors and academic advisor in an individualized advising system.

Program Requirements

First Year
Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication (p. 22)</td>
<td></td>
<td>3</td>
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<tr>
<td>GEOG 203 &amp; GEOG 213</td>
<td>Planet Earth and Planet Earth Lab</td>
<td>4</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
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<td>Botany</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>GEOL 101</td>
<td>Principles of Geology</td>
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<td>College Physics</td>
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Semester Credit Hours 14

Spring

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<td>Business Calculus</td>
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<td>Zoology</td>
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<td>BIOL 112</td>
<td>Introductory Biology II</td>
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<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
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<td>GEOL 106</td>
<td>Historical Geology</td>
<td></td>
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<td>PHYS 202</td>
<td>College Physics</td>
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<tr>
<td>OCNG 251 &amp; OCNG 252</td>
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Semester Credit Hours 16

Second Year
Fall

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<tbody>
<tr>
<td>GEOG 232</td>
<td>Cartography and Visualization</td>
<td>3</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
<td>American history (p. 25)</td>
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<td>Creative arts (p. 24)</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
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Semester Credit Hours 15

Spring

Select one of the following: 3

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<tr>
<td>GEOG 324</td>
<td>Global Climatic Regions</td>
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<td>GEOG 331</td>
<td>Geomorphology</td>
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<td>GEOG 335</td>
<td>Pattern and Process in Biogeography</td>
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<tr>
<td>GEOG 352/GEOL 352</td>
<td>GNSS in the Geosciences</td>
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STAT 303  Statistical Methods  3
American history (p. 25)  3
Language, philosophy and culture (p. 23)  3

Semester Credit Hours  15

Third Year

Fall
Select one of the following:  3
GEOG 304  Economic Geography
GEOG 306  Introduction to Urban Geography
GEOG 311  Cultural Geography
Select one of the following:  3
GEOG 324  Global Climatic Regions
GEOG 331  Geomorphology
GEOG 335  Pattern and Process in Biogeography
GEOG 361  Remote Sensing in Geosciences  4
GEOG 390  Principles of Geographic Information Systems  4

Semester Credit Hours  14

Spring
ESSM 459  or GEOG 391  Programming for Spatial Data Applications  3
ingeography 3
or Geodatabases
GEOG 312  Data Analysis in Geography  3
GEOG 475  Advanced Topics in GIS (Geographic Information Systems)  4
Direct elective  3  4
Select one of the following:
BESC 201  Introduction to Bioenvironmental Sciences
BESC 367  U.S. Environmental Regulations
BESC 403  Sampling and Environmental Monitoring
ESSM 305  Watershed Analysis and Planning
ESSM 308  Fundamentals of Environmental Decision-Making
ESSM 309  Forest Ecology
ESSM 351/ RENR 405  Geographic Information Systems for Resource Management
ESSM 406  Natural Resources Policy
ESSM 416  Fire Ecology and Natural Resource Management
ESSM 440  Wetland Delineation
ESSM 464  Spatial Project Management
GEOL 104  Physical Geology
GEOL 306  Sedimentology and Stratigraphy
GEOL 410  Hydrogeology
RENR 205  Fundamentals of Ecology
RENR 470  Environmental Impact Assessment
STAT 211  Principles of Statistics I
STAT 212  Principles of Statistics II
Track elective  6

Semester Credit Hours  16

Fourth Year

Fall
GEOG 477  Terrain Analysis and Mapping  4
Directed elective  3  6
Select two of the following:
BESC 201  Introduction to Bioenvironmental Sciences
BESC 367  U.S. Environmental Regulations
BESC 403  Sampling and Environmental Monitoring
ESSM 305  Watershed Analysis and Planning
ESSM 308  Fundamentals of Environmental Decision-Making
ESSM 309  Forest Ecology
ESSM 351/ RENR 405  Geographic Information Systems for Resource Management
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RENR 205  Fundamentals of Ecology
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STAT 211  Principles of Statistics I
STAT 212  Principles of Statistics II

Semester Credit Hours  14

Spring
GEOG 479  Principles of Geocomputation  4
GEOG 476  GIS Practicum  3
Directed elective  3  9
Select three of the following:
BESC 201  Introduction to Bioenvironmental Sciences
BESC 367  U.S. Environmental Regulations
BESC 403  Sampling and Environmental Monitoring
ESSM 305  Watershed Analysis and Planning
ESSM 308  Fundamentals of Environmental Decision-Making
ESSM 309  Forest Ecology
ESSM 351/ RENR 405  Geographic Information Systems for Resource Management
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GEOL 306  Sedimentology and Stratigraphy
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STAT 211  Principles of Statistics I
STAT 212  Principles of Statistics II

Semester Credit Hours  16

Spring
GEOG 479  Principles of Geocomputation  4
GEOG 476  GIS Practicum  3
Directed elective  3  9
Select three of the following:
### Geographic Information Science and Technology - BS, Human Systems and Society Track

The BS in Geographic Information Science and Technology (GIST) requires semester credit hours for completion in the Computation, Design, and Analysis (CDA), Earth Systems Analysis (ESA), or the Human Systems and Society (HSS) tracks.

The Human Systems and Society (HSS) track is designed to attract students interested in applying GIST to human geography. It emphasizes social sciences, human/environment relationships, and the planning and management of human resources and urban environments, as well as provides students a solid grounding in GIST.

Students will receive a rigorous and modern-day education and training in GIST with application knowledge in physical and human geography. Employers require problem solvers, not button pushers, to address problems in various application domains. The BS in GIST is designed to:

- Provide modern-day exposure to the rapidly changing field of GIST
- Balance education and training with a focus on competency
- Provide application and problem-solving experiences
- Support student activities and research

Geospatial technology graduates are in extremely high demand and according to the US Department of Labor (USDL), are one of the highest growth areas in the federal government, particularly in homeland security activities, as well as in energy, software and engineering firms, and biomedical and biohazard research, among many others. A 35% annual rate of growth in Geospatial Technology related degrees are projected by the United States Department of Labor. Specifically, students have employment opportunities with the following corporate and government entities:

- Government agencies (federal, state, county, and city): management and planning of urban infrastructure, inventory and assessment of natural resources including agriculture, forestry, and water resources.
- Energy industry: assessing biofuel production and identifying locations suitable for renewable energy resources and mineral exploration.
- Health science industry: determine hotspots of health events and explore causative influences.
- Military and intelligence community: numerous opportunities exist in military branches, and agencies such as the Central Intelligence Agency, National Security Agency, and other intelligence organizations.
- Commercial industries: business analytics and marketing, as spatial information can be used to target marketing campaigns, and suitable site assessment to locate companies.
- Geospatial industries: software development, geotechnical engineering, and technology development.

Students select courses with the assistance of faculty advisors and academic advisor in an individualized advising system.

### Program Requirements

#### First Year

**Fall**

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<tr>
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<tbody>
<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
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<tr>
<td>&amp; GEOG 213</td>
<td>Planet Earth Lab</td>
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<tr>
<td>&amp; ATMO 202</td>
<td>Weather and Climate Laboratory</td>
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</table>

**Semester Credit Hours**: 14

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1. 8 hours required. Department requires that you take two in the same discipline to meet this requirement.
2. Track electives comprise 6 hours of focused coursework. The track and specific courses within the track are to be chosen in consultation with the advisor and/or faculty mentor.
3. 19 hours required. To be selected from the following or chosen in consultation with an advisor.
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<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<td>and Fundamentals of Chemistry Laboratory II</td>
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**Second Year**

**Fall**

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<tr>
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**Spring**

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**Third Year**

**Fall**

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<td>GEOG 306</td>
<td>Introduction to Urban Geography</td>
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<td>GEOG 311</td>
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**Fourth Year**

**Fall**

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<td>GEOG 477</td>
<td>Terrain Analysis and Mapping</td>
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<td>GEOG 479</td>
<td>Principles of Geocomputation</td>
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Semester Credit Hours | 14
Geography - BS

A student seeking a Bachelor of Science degree in Geography is expected to complete a minimum curriculum of 56 hours in geography, with 18 of those hours chosen from one of the following selected tracks of focus: Human Geography, Geography of the Natural Environment, Human-Environment Interactions, or Geography. The Department of Geography also administers the Bachelor of Science degree program in Environmental Studies for the College of Geosciences. Geography courses may include field trips outside scheduled class hours, including study abroad experiences.

Geography graduates apply their knowledge and analytical skills for jobs applying locational and environmental analysis for rewarding careers in education, business, or industry, local, state, and federal agencies, as well as nonprofit organizations. Advanced degrees provide greater career opportunities.

For students interested in a career in education, the Department of Geography works closely with the Department of Teaching, Learning, and Culture. Geography is part of a Social Studies composite degree program that prepares students to teach at middle and high school levels.

Program Requirements

First Year

Fall

First Year Semester Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
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<td>Communication elective (p. 22)</td>
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<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>GEOL 101</td>
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Spring

Spring Semester Credit Hours

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<td>GEOG 477</td>
<td>Terrain Analysis and Mapping</td>
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<td>GEOG 479</td>
<td>Principles of Geocomputation</td>
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Select from the following:

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<td>RENR 470</td>
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Directed elective: 6-7

Select from the following:

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Total Semester Credit Hours: 160

1 8 hours required. Department requires that you take two in the same discipline to meet this requirement.

2 Track electives comprise 6 hours of focused coursework. The track and specific courses within the track are to be chosen in consultation with the advisor and/or faculty mentor.

3 19-20 hours required. To be selected from the following or chosen in consultation with Advisor.

Two courses in the degree plan must be Writing Intensive courses designated by the department in the schedule of classes. Also, International and Cultural Diversity Electives (6 hours) must be incorporated into the degree.
### Geography - BS

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<td>GEOG 202</td>
<td>Geography of the Global Village</td>
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<td>GEOG 203</td>
<td>Planet Earth</td>
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<td>Finite Mathematics</td>
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<td>&amp; CHEM 112</td>
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<td>American National Government</td>
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<td>STAT 303</td>
<td>Statistical Methods</td>
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<td>Introduction to Urban Geography</td>
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<td>GEOG 331 Geomorphology</td>
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<td></td>
<td>GEOG 335 Pattern and Process in Biogeography</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>Geography of the United States</td>
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<td>GEOG 305</td>
<td>Geography of Texas</td>
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<td>GEOG 320</td>
<td>The Middle East</td>
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<td>GEOG 323</td>
<td>Geography of Latin America</td>
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<td>GEOG 325</td>
<td>Geography of Europe</td>
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<td>Field Geography</td>
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<td>GEOG 323 Geography of Latin America</td>
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<td>GEOG 440</td>
<td>History and Nature of Geography</td>
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<td>GEOG 476 GIS Practicum</td>
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</table>

**Total Semester Credit Hours**: 120

1. 8 hours required. Department requires that you take two in the same discipline to meet this requirement.
2. Courses to be approved by advisor.
3. Track electives comprise 18 hours of focused coursework beyond the Geography core. The track and the specific courses within the track are to be chosen in consultation with the academic advisor from the list below.
4. At most, one of these courses may be chosen from GEOG 301, GEOG 305.

Two courses in the degree plan must be Writing Intensive courses designated by the department in the schedule of classes. Also, International and Cultural Diversity Electives (6 hours) must be incorporated into the degree.
## Track Options

### Geography Track Electives

<table>
<thead>
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<td>Economic Geography</td>
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<td>GEOG 305</td>
<td>Geography of Texas</td>
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<td>GEOG 306</td>
<td>Introduction to Urban Geography</td>
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<td>GEOG 309</td>
<td>Geography of Energy</td>
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<td>Data Analysis in Geography</td>
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<td>The Middle East</td>
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<td>GEOG 323</td>
<td>Geography of Latin America</td>
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<td>GEOG 324</td>
<td>Global Climatic Regions</td>
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<td>GEOG 325</td>
<td>Geography of Europe</td>
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<td>Geography of South Asia</td>
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<td>GEOG 330</td>
<td>Resources and the Environment</td>
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<td>GEOG 355</td>
<td>Concepts in Geographic Education</td>
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<td>GEOG 360</td>
<td>Natural Hazards</td>
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<td>GEOG 361</td>
<td>Remote Sensing in Geosciences</td>
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<td>GEOG 370/</td>
<td>Coastal Processes</td>
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<td>Arid Lands Geomorphology</td>
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<td>GEOG 406</td>
<td>Geographic Perspectives on Contemporary Urban Issues</td>
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<td>Hydrology and Environment</td>
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<td>GEOG 435</td>
<td>Principles of Plant Geography</td>
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<td>GEOG 467</td>
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<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
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**Total Semester Credit Hours 18**

### Human-Environment Interactions Track Electives

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<td>GEOG 360</td>
<td>Natural Hazards</td>
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**Select four of the following:**

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<td>Geography of Energy</td>
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<td>Data Analysis in Geography</td>
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<td>GEOG 404</td>
<td>Spatial Thinking, Perception and Behavior</td>
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<td>Environmental Justice</td>
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<td>GEOG 434</td>
<td>Hydrology and Environment</td>
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<td>GEOG 467</td>
<td>Dynamic Modeling of Earth and Environmental Systems</td>
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**Total Semester Credit Hours 18**

### Human Geography Track Electives

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<td>GEOG 311</td>
<td>Cultural Geography</td>
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**Choose two of the following:**

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<td>The Middle East</td>
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<td>GEOG 323</td>
<td>Geography of Latin America</td>
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<td>GEOG 325</td>
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<tr>
<td>GEOG 327</td>
<td>Geography of South Asia</td>
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</table>

**Total Semester Credit Hours 18**

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**Notes:**
1. Choose one from the following: GEOG 434, GEOG 435, GEOG 442, or GEOG 467.
University Studies - BS, Geographic Information Science and Technology Concentration

The broad objective of the academic discipline of geography is to understand and improve the human environment: Earth. Understanding the Earth's surface requires a consideration of both natural and social processes, hence geography is by nature interdisciplinary. Human-environment interactions are of particular interest in geography. The area of concentration in geography offers students a broad perspective on the Earth as human habitat, while permitting them to complete two supporting minors in other disciplines. The area of concentration is flexible in that numerous courses are included to permit a student to build a course of study in geography that is tailored to his or her interests. Ideally, the minors would be in related fields to build depth and breadth around themes that the student wishes to emphasize.

Program Requirements

<table>
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<tr>
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<td>GNSS in the Geosciences</td>
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<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
<td>4</td>
</tr>
</tbody>
</table>

Select from the following: 6-8

- ESSM 459 Programming for Spatial Data Applications
- CSCE 111 Introduction to Computer Science Concepts and Programming
- GEOG 232 Cartography and Visualization
- GEOG 398 Interpretation of Aerial Photographs
- GEOG 392 GIS Programming
- GEOG 461 Digital Image Processing in the Geosciences
- GEOG 475 Advanced Topics in GIS (Geographic Information Systems)
- GEOG 312 Data Analysis in Geography
- GEOG 479 Principles of Geocomputation
- GEOG 461 Digital Image Processing in the Geosciences

University and College Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Communication elective (p. 22)</td>
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</table>

University Studies - BS, Geography Concentration

The broad objective of the academic discipline of geography is to understand and improve the human environment: Earth. Understanding the Earth’s surface requires a consideration of both natural and social processes, hence geography is by nature interdisciplinary. Human-environment interactions are of particular interest in geography. The area of concentration in geography offers students a broad perspective on the Earth as human habitat, while permitting them to complete two supporting minors in other disciplines. The area of concentration is flexible in that numerous courses are included to permit a student to build a course of study in geography that is tailored to his or her interests. Ideally, the minors would be in related fields to build depth and breadth around themes that the student wishes to emphasize.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 202</td>
<td>Geography of the Global Village</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following: 3

- GEOG 304 Economic Geography
- GEOG 306 Introduction to Urban Geography
- GEOG 309 Geography of Energy
- GEOG 311 Cultural Geography
- GEOG 312 Data Analysis in Geography
- GEOG 324 Global Climatic Regions
- GEOG 330 Resources and the Environment
- GEOG 331 Geomorphology
- GEOG 335 Pattern and Process in Biogeography
- GEOG 232 Cartography and Visualization
GEOG 352/ GEOL 352 GNSS in the Geosciences
GEOG 355 Concepts in Geographic Education
GEOG 360 Natural Hazards
GEOG 361 Remote Sensing in Geosciences
GEOG 370/ MARS 370 Coastal Processes
GEOG 380 Workshop in Environmental Studies
GEOG 390 Principles of Geographic Information Systems
GEOG 398 Interpretation of Aerial Photographs
GEOG 400 Arid Lands Geomorphology
GEOG 401 Political Geography
GEOG 404 Spatial Thinking, Perception and Behavior
GEOG 406 Geographic Perspectives on Contemporary Urban Issues
GEOG 420 Geography of Terrorism
GEOG 430 Environmental Justice
GEOG 434 Hydrology and Environment
GEOG 435 Principles of Plant Geography
GEOG 440 History and Nature of Geography
GEOG 442/ Past Climates
GEOS 442
GEOG 450 Field Geography
GEOG 462/ Advanced GIS Analysis for Natural Resources Management
GEOG 467 Dynamic Modeling of Earth and Environmental Systems
GEOG 475 Advanced Topics in GIS (Geographic Information Systems)
GEOG 476 GIS Practicum
GEOG 485 Directed Studies
GEOG 489 Special Topics in...
GEOG 491 Research
Select two of the following: 6
GEOG 301 Geography of the United States
GEOG 304 Economic Geography
GEOG 305 Geography of Texas
GEOG 306 Introduction to Urban Geography
GEOG 309 Geography of Energy
GEOG 311 Cultural Geography
GEOG 312 Data Analysis in Geography
GEOG 320 The Middle East
GEOG 323 Geography of Latin America
GEOG 324 Global Climatic Regions
GEOG 325 Geography of Europe
GEOG 327 Geography of South Asia
GEOG 330 Resources and the Environment
GEOG 331 Geomorphology
GEOG 335 Pattern and Process in Biogeography
GEOG 352/ GEOL 352 GNSS in the Geosciences
GEOG 355 Concepts in Geographic Education
GEOG 360 Natural Hazards
GEOG 361 Remote Sensing in Geosciences
GEOG 370/ MARS 370 Coastal Processes
GEOG 380 Workshop in Environmental Studies
GEOG 390 Principles of Geographic Information Systems
GEOG 398 Interpretation of Aerial Photographs
GEOG 400 Arid Lands Geomorphology
GEOG 401 Political Geography
GEOG 404 Spatial Thinking, Perception and Behavior
GEOG 406 Geographic Perspectives on Contemporary Urban Issues
GEOG 420 Geography of Terrorism
GEOG 430 Environmental Justice
GEOG 434 Hydrology and Environment
GEOG 435 Principles of Plant Geography
GEOG 440 History and Nature of Geography
GEOG 442/ Past Climates
GEOS 442
GEOG 450 Field Geography
GEOG 462/ Advanced GIS Analysis for Natural Resources Management
GEOG 467 Dynamic Modeling of Earth and Environmental Systems
GEOG 475 Advanced Topics in GIS (Geographic Information Systems)
**University and College Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
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<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
<td>4</td>
</tr>
<tr>
<td>&amp; GEOG 213</td>
<td>Planet Earth Lab</td>
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Select one of the following:

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<thead>
<tr>
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<td>GEOG 401</td>
<td>Political Geography</td>
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<tr>
<td>GEOG 405</td>
<td>Field Trips</td>
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<td>GEOG 420</td>
<td>Geography of Terrorism</td>
<td></td>
</tr>
<tr>
<td>GEOG 435</td>
<td>Principles of Plant Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 440</td>
<td>History and Nature of Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 450</td>
<td>Field Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 489</td>
<td>Special Topics in...</td>
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</table>

**General Requirements**

1. Geography Minor: minimum of 16 credits in the discipline with at least 6 hours in upper-division courses, 3 hours of which must be at the 400-level.
2. Minimum of 6 credits must be taken in residence at either Texas A&M University or Texas A&M at Galveston.
3. Students must meet with the department's advisor for minor programs for approval of courses selected (any substitutions must be approved by the department head).
4. Minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.
Geographic Information Science and Technology - Minor

Geographic Information Science and Technology (GIST) is used to solve problems associated with land administration, environment and natural resource management, planning and population studies, as well as traditional surveying and mapping applications. GIST uses GIS, remote sensing, and global positioning mapping to collect, analyze and display spatial information.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>GEOG 352/GEOL 352</td>
<td>GNSS in the Geosciences</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 361</td>
<td>Remote Sensing in Geosciences ¹</td>
<td>4</td>
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<tr>
<td>GEOG 390</td>
<td>Principles of Geographic Information Systems</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one of the following: 4

- GEOG 392 GIS Programming
- GEOG 461 Digital Image Processing in the Geosciences
- GEOG 475 Advanced Topics in GIS (Geographic Information Systems) ²
- GEOG 477 Terrain Analysis and Mapping
- GEOG 478 WebGIS
- GEOG 479 Principles of Geocomputation

Total Semester Credit Hours 15

¹ Fall semester course
² Spring semester course

General Requirements

1. Geographic Information Science and Technology (GIST): minimum of 15 credits in the discipline at 300-400 level.
2. Minimum of 6 credits must be taken in residence at either Texas A&M University or Texas A&M at Galveston.
3. Students must meet with the department’s advisor for minor programs for approval of courses selected (any substitutions must be approved by the department head).
4. Minimum cumulative GPR of 2.0 must be achieved for all courses in the minor.

Geophysics

Geophysics includes all areas of scientific inquiry that deal with the physical state of Earth and other planets and the dynamic processes that act on and within planetary bodies. The Bachelor of Science in Geophysics is for students who wish to combine a proficiency in mathematics with an interest in Earth. The objective of this program is to develop a physically-motivated approach to the study of Earth phenomena, with an emphasis on collection and analysis of geophysical data for probing and imaging the Earth’s interior. Graduates will be well-prepared for careers in the energy and environmental industries, and for advanced study at top-ranked graduate programs.

Minors in Geology and Geophysics

The Department of Geology and Geophysics offers minors in two separate programs: Geology, Geophysics. Minors provide opportunities for broadening a student’s background and tailoring the curriculum to specific career goals. For example, a minor in Geology or Geophysics may be especially beneficial to students majoring in fields that deal directly or indirectly with geological processes. These include agriculture, anthropology, archaeology, architecture, business, education, engineering, and soil science, to name a few.

Majors

- Bachelor of Arts in Geology (p. 451)
- Bachelor of Arts in Geology and Master of Ocean Science and Technology, 5-Year Degree Program (p. 453)
- Bachelor of Science in Geology (p. 454)
- Bachelor of Science in Geology and Master of Ocean Science and Technology, 5-Year Degree Program (p. 455)
- Bachelor of Science in Geophysics (p. 457)

Minors

- Geology Minor (p. 458)
- Geophysics Minor (p. 458)

Geology - BA

The Bachelor of Arts in Geology provides a foundation in geology for students who are not planning a career as a geologist. This program provides a basis for science-related careers, such as environmental law, pre-college teaching, science journalism, and resource management and marketing. Graduates will supplement their curriculum in geology with a minor designed around their career goals. The minor requires a minimum
of 15 credit hours in one discipline, to be chosen in consultation with an advisor.

Because the BA program has less rigorous mathematics and physics requirements and less comprehensive geology requirements, the BS is considered the appropriate option for students considering graduate study in geology.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>3</td>
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<td></td>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GEOL 104</td>
<td>Physical Geology</td>
<td>4</td>
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<td></td>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
<td>3</td>
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<td></td>
<td>or MATH 141</td>
<td>Finite Mathematics</td>
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<td><strong>Spring</strong></td>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>3</td>
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<td></td>
<td>CHEM 112</td>
<td>Fundamentals of Chemistry Laboratory II</td>
<td>1</td>
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<td></td>
<td>GEOL 106</td>
<td>Historical Geology</td>
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<td>Select one of the following:</td>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
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<td></td>
<td>MATH 142</td>
<td>Business Calculus</td>
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<td></td>
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<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
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#### Second Year

<table>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>GEOL 203</td>
<td>Mineralogy</td>
<td>4</td>
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<td></td>
<td>GEOP 341</td>
<td>Fundamentals of Geophysics</td>
<td>3</td>
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<tr>
<td></td>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>or PHYS 218</td>
<td>or Mechanics</td>
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<td></td>
<td>Minor elective</td>
<td>Semester Credit Hours</td>
<td>3</td>
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<tr>
<td><strong>Spring</strong></td>
<td>GEOL 302</td>
<td>Introduction to Petrology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GEOL 309</td>
<td>Introduction to Geological Field Methods</td>
<td>3</td>
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<tr>
<td></td>
<td>PHYS 202</td>
<td>College Physics</td>
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<td></td>
<td>or PHYS 208</td>
<td>or Electricity and Optics</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<td>Semester Credit Hours</td>
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#### Third Year

<table>
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<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>Select one of the following:</td>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Government/Political science (p. 25)</td>
<td>Geology elective (p. 826)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Minor elective</td>
<td>Semester Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral science elective (p. 25)</td>
<td>Semester Credit Hours</td>
<td>3</td>
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#### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>Select one of the following:</td>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Government/Political science (p. 25)</td>
<td>Creative arts elective (p. 24)</td>
<td>4</td>
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<tr>
<td></td>
<td>General elective</td>
<td>Semester Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Geology elective (p. 826)</td>
<td>Minor elective</td>
<td>3</td>
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<td>Semester Credit Hours</td>
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<tr>
<td><strong>Spring</strong></td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td>Government/Political science (p. 25)</td>
<td>General elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>Semester Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Minor elective</td>
<td>Semester Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>12</td>
<td></td>
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</tbody>
</table>

1. Fifteen hours of electives must be selected in a minor. Electives must be chosen in consultation with advisor.
2. Any 300- or 400-level geology or geophysics course not already required.
3. Any science, math, engineering or social science course that augments the degree with the approval of the advisor.
4. Six hours must be selected from courses that also satisfy the international and cultural diversity requirement.
5. General electives may not include STLC 100-499 (p. 972); SLCX 100-499; DEVX 100-499; BUSN 100; ENGL 103; GEOL 101-104 (p. 826); KINE 198, KINE 199; MATH 102, MATH 131, MATH 141, MATH 142, MATH 150, MATH 151, MATH 166, MATH 171; AERS 100-499 (p. 702); MLSC 100-499 (p. 900); NVSC 100-499 (p. 918); SOMS 100-499 (p. 964).
Geology - 5-Year Bachelor of Arts/Master of Ocean Science and Technology

The Fast Track Program offers motivated and exceptional students the opportunity to achieve aspirations in an efficient 5 year program at Texas A&M, completing either the Bachelor of Science (B.S.) or Bachelor of Arts (B.A.) degree (in the Department of Geology and Geophysics) and the non-thesis Master of Ocean Science and Technology (in the Department of Oceanography). There will be only two courses used for dual credit in this program. There is a total of 150 hours of coursework. The concurrent degree program will enable these motivated students to coordinate the required B.A./B.S. coursework (120 undergraduate credit hours including 6 dual credit graduate hours) and non-thesis M.S. coursework (36 credit hours including the 6 dual credit graduate hours) to complete the required credit hours for each degree without diminishing scope or quality of work and within 5 years.

Application and Eligibility:

- Applications to the Fast Track program will be submitted by July 1 after the completion of the student's junior year. Applications submitted after that time will be evaluated on a case by case basis.
- Applicants must have a minimum undergraduate GPR of 3.0. Applicants should also earn a C or better in all Chemistry, Calculus and Physics courses. Once admitted to the program, students must maintain a minimum 3.0 GPR.
- A faculty advisor will be assigned to each student. Students may seek additional mentors, but a formal committee is not required.
- Students admitted into the Fast Track program must finish the entire 150 credit hours to obtain both the Bachelor’s and Master’s degrees. These students will be conferred with two degrees once they complete the 5th year of the concurrent program.
- Students admitted to the program will change from U4 to G7 status when they are admitted having completed at least 102 hours (end of spring semester, year 3).
- Students not accepted or not allowed to continue with the Fast Track Program will complete the 120 hour Bachelor’s degree under the standard 4 year curriculum. These students may still apply to the traditional graduate program.
- Students will graduate at the completion of the 5th year in the Fast Track Program coursework (150 credit hours) with both Bachelor’s and Master’s degrees. Students will complete the coursework in May of the 5th year.

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>GEOL 104</td>
<td>Physical Geology</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<table>
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<tr>
<th>Second Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>GEOL 203</td>
<td>Mineralogy</td>
</tr>
<tr>
<td>GEOL 311</td>
<td>Principles of Geological Writing</td>
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<tr>
<td>GEOP 341</td>
<td>Fundamentals of Geophysics</td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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<td>Minor elective</td>
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<tbody>
<tr>
<td>GEOL 106</td>
<td>Historical Geology</td>
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<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<td>CHEM 112 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry Laboratory II</td>
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<td>MATH 152</td>
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<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>GEOL 302</td>
<td>Introduction to Petrology</td>
</tr>
<tr>
<td>GEOL 306</td>
<td>Sedimentology and Stratigraphy</td>
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<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<td>Select one of the following:</td>
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<tr>
<td>American history (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Government/Political science (p. 25)</td>
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<tr>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>GEOL 330</td>
<td>Geologic Field Trips</td>
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<td>GEOL elective</td>
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<td>Select one of the following:</td>
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<tr>
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<tr>
<td>Government/Political science (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>American history (p. 25)</td>
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</tr>
<tr>
<td>Government/Political science (p. 25)</td>
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<td>Free elective</td>
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<thead>
<tr>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>GEOL 309</td>
<td>Introduction to Geological Field Methods</td>
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<td>GEOL 312</td>
<td>Structural Geology and Tectonics</td>
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<tr>
<td>Minor elective</td>
<td>1,2</td>
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<tr>
<td>Creative arts (p. 24)</td>
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<table>
<thead>
<tr>
<th>Spring</th>
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<tr>
<td>GEOL 330</td>
<td>Geologic Field Trips</td>
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<tr>
<td>GEOL elective</td>
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<tr>
<td>Minor elective</td>
<td>1,2</td>
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<tr>
<td>Minor elective</td>
<td>1,2</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td>3</td>
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</table>

<table>
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<tr>
<th>Fourth Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
</tbody>
</table>
Advanced specialized OCNG graduate courses

Semester Credit Hours

Spring

OCNG 604 Ocean Observing Systems
1,5,6

OCNG 608 Physical Oceanography
1,5,6

Select one from: 2,5

OCNG 620 Biological Oceanography

OCNG 630 Geological Oceanography

OCNG 640 Chemical Oceanography

Semester Credit Hours

American history (p. 25)

Government/Political science (p. 25)

OCNG 657 Data Methods and Graphical Representation in Oceanography

Select one from:

OCNG 608

OCNG 604

OGN 620 Biological Oceanography

OCNG 630 Geological Oceanography

OCNG 640 Chemical Oceanography

Semester Credit Hours

Total Semester Credit Hours 132

Fifth Year

Fall

Advanced specialized OCNG graduate courses

Semester Credit Hours

Spring

OCNG 651 Advanced Oceanographic Data Analysis and Communication

Advanced specialized OCNG graduate courses

Semester Credit Hours

Total Semester Credit Hours 18

Geology - BS

The BS in Geology is considered the preparatory degree for careers in geological science. Graduates typically go on to careers in the energy and environmental industries, and advanced study at top-ranked graduate programs. The first two years of the BS program in Geology provide students with the basics of geology and the supporting fields of chemistry, physics and mathematics. The junior and senior years involve more advanced study in the field of geology and the opportunity to concentrate study in specific disciplines through the selection of technical electives. The Geology and Geophysics Department offers summer field camp (GEOL 350) in the Western US, in which students apply their geologic knowledge to collecting data and solving real problems during a four-week field season. Seniors will participate in a group research capstone course, in which they work in teams with a faculty advisor to solve a current problem and communicate their findings and experience. Students also have opportunities to become involved in individual research problems with faculty members and can receive course credit for this activity through research hours (GEOL 291 and GEOL 491).

The BS is the appropriate degree for students intending to pursue graduate study in geology. Students planning a research or university teaching career should pursue a PhD degree. Particular selections of elective can be used to refine the degree.

Some of society’s most pressing problems, including groundwater contamination and remediation, water resources, and geologic hazards such as landslides, flooding and subsidence are addressed in the field of environmental geology. Environmental geologists typically find careers with environmental and engineering consulting companies and other industrial corporations, governmental agencies or academia. Students are well-prepared for the Association of State Boards of Geology (ASBOG) Fundamentals of Geology exam, which is required for appointment as a Professional Geologist in the State of Texas. Specific elective classes recommended include CVEN 365, GEOG 331, GEOG 390, GEOL 410, GEOL 420, GEOL 440, GEOS 410 and approved classes in other departments including Soil Science, Chemistry, Physics and Civil Engineering.

Many geologists go on to employment in the field of petroleum exploration and extraction. Some of the required geology classes prepare students for this field. Additional recommended classes including GEOL 404, PETE 311, PETE 321, PETE 324 and PETE 402. Qualified students (GPR of 3.0 or higher with dean’s permission) may also take related graduate courses during the senior year. Such classes include GEOL 619, GEOL 622, GEOL 623, GEOL 624, GEOL 668, and GEOP 629. These classes prepare students for graduate study, as well as provide training for those who may be interested in service jobs in the oil and gas industry between their undergraduate and graduate education.

To remain in satisfactory academic standing, students must maintain a 2.0 or better GPR in all technical courses (geology, geophysics, chemistry, math and physics). Some courses require field trips. Students must pay expenses incurred on such trips.

1 If students use allowed OCNG courses (e.g. OCNG 251, OCNG 252, OCNG 350 etc.) as minor or free electives, they will receive an OCNG minor with their BA in GEOL.
2 Select in consultation with advisor.
3 Students must complete 6 credit hours of American history and 6 credit hours of government/political science.
4 A second W course is required. GEOL 312 is offered as a W option when taught by Dr. Julie Newman, and other GEOL electives also fulfill the W requirement (including GEOL 491 when arranged with the permission of the instructor).
5 Students will not be permitted to receive credit for both the 400- and 600-level versions of certain courses because the content and learning outcomes are too similar (e.g. OCNG 410/OCNG 608, OCNG 440/OCNG 640)
6 Two graduate courses will be taken for dual undergraduate/graduate credit and may contribute to the minor.
Program Requirements

First Year
Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
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<tr>
<td>GEOL 150</td>
<td>Introduction to the Solid Earth</td>
<td>4</td>
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<tr>
<td>GEOL 180</td>
<td>Introduction to Geology and Geophysics</td>
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Spring

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<th>Course Title</th>
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<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>GEOL 152</td>
<td>History of the Earth</td>
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Second Year
Fall

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<tr>
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<td>GEOL 210</td>
<td>Geological Communication</td>
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<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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Spring

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<th>Course Title</th>
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<tbody>
<tr>
<td>GEOL 304</td>
<td>Igneous and Metamorphic Petrology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 250</td>
<td>Geological Field Methods</td>
<td>4</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
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<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
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Third Year
Fall

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<tr>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>GEOP 341</td>
<td>Fundamentals of Geophysics</td>
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<tr>
<td>GEOL 306</td>
<td>Sedimentology and Stratigraphy</td>
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<tr>
<td>Government/Political science (p. 25)</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
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<td>3</td>
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<td>Semester Credit Hours</td>
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Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 312</td>
<td>Structural Geology and Tectonics</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 314</td>
<td>Paleontology and Geobiology</td>
<td>4</td>
</tr>
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<td>Select one of the following:</td>
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<td>3</td>
</tr>
<tr>
<td>Government/Political science (p. 25)</td>
<td></td>
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<tr>
<td>Technical elective</td>
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Fourth Year
Fall

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<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td>GEOL 450</td>
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<tr>
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<tr>
<td>Government/Political science (p. 25)</td>
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<tr>
<td>Technical elective</td>
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Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Select one of the following:</td>
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<td>3</td>
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<tr>
<td>American history (p. 25)</td>
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<td></td>
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<tr>
<td>Social and behavioral science elective (p. 25)</td>
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<td>3</td>
</tr>
<tr>
<td>Technical elective</td>
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<td>6</td>
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<tr>
<td>Creative arts elective (p. 24)</td>
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<td>Semester Credit Hours</td>
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Summer

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>GEOL 350</td>
<td>Summer Field Geology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 120

1 Any approved 400-level geology or geophysics course not already required.
2 Any science, math or engineering course that augments the degree with the approval of the advisor.
3 Six hours must be selected from courses that also satisfy the International and Cultural diversity requirement.

Geology - 5-Year Bachelor of Science/Master of Ocean Science and Technology

The Fast Track Program offers motivated and exceptional students the opportunity to achieve aspirations in an efficient 5 year program at Texas A&M, completing either the Bachelor of Science (B.S.) or Bachelor of Arts (B.A.) degree (in the Department of Geology and Geophysics) and the non-thesis Master of Ocean Science and Technology (in the Department of Oceanography). There will be only two courses used for dual credit in this program. There is a total of 150 hours of coursework. The concurrent degree program will enable these motivated students to coordinate the required B.A./B.S. coursework (120 undergraduate credit hours including 6 dual credit graduate hours) and non-thesis M.S. coursework (36 credit hours including the 6 dual credit graduate hours) to complete the required credit hours for each degree without diminishing scope or quality of work and within 5 years.

Application and Eligibility

- Applications to the Fast Track program will be submitted by July 1 after the completion of the student’s junior year. Applications submitted after that time will be evaluated on a case by case basis.
- Applicants must have a minimum undergraduate GPR of 3.0. Applicants should also earn a C or better in all Chemistry, Calculus and Physics courses. Once admitted to the program, students must maintain a minimum 3.0 GPR.
• A faculty advisor will be assigned to each student. Students may seek additional mentors, but a formal committee is not required.
• Students admitted into the Fast Track program must finish the entire 150 credit hours to obtain both the Bachelor’s and Master’s degrees. These students will be conferred with two degrees once they complete the 5th year of the concurrent program.
• Students admitted to the program will change from U4 to G7 status when they are admitted having completed at least 96 hours (end of spring semester, year 3).
• Students not accepted or not allowed to continue with the Fast Track Program will complete the 120 hour Bachelor’s degree under the standard 4 year curriculum. These students may still apply to the traditional graduate program.

Students will graduate at the completion of the 5th year in the Fast Track Program coursework (150 credit hours) with both Bachelor’s and Master’s degrees. Students will complete the coursework in May of the 5th year.

Program Requirements

First Year
Fall
GEOL 104  Physical Geology  4
CHEM 101  & CHEM 111  Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I  4
MATH 151  Engineering Mathematics I  4
ENGL 104  Composition and Rhetoric  3
Semester Credit Hours  15

Spring
GEOL 106  Historical Geology  4
CHEM 102  & CHEM 112  Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II  4
MATH 152  Engineering Mathematics II  4
Communication (p. 22)  3
Semester Credit Hours  15

Second Year
Fall
GEOL 203  Mineralogy  1 4
GEOL 311  Principles of Geological Writing  1,2 1
GEOP 341  Fundamentals of Geophysics  1 3
PHYS 218  Mechanics  1 4
MATH 251  Engineering Mathematics III  1 3
Semester Credit Hours  15

Spring
GEOL 302  Introduction to Petrology  1 4
GEOL 306  Sedimentology and Stratigraphy  1 4
PHYS 208  Electricity and Optics  1 4
MATH 308  Differential Equations  1 3
Select one of the following:  3 3
American history (p. 25)  1
Semester Credit Hours  15

Third Year
Fall
GEOL 304  Igneous and Metamorphic Petrology  1 4
GEOL 305  Paleobiology  1 3
GEOL 451  Introduction to Geochemistry  1 3
Language, philosophy and culture (p. 23)  3
Select one of the following:  3 3
American history (p. 25)  1
Government/Political science (p. 25)  1
Semester Credit Hours  16

Spring
GEOL 309  Introduction to Geological Field Methods  3
GEOL 312  Structural Geology and Tectonics  1,2 4
GEOL Elective  1,2,4 4
Technical elective  4 3
Creative arts (p. 24)  1 3
Semester Credit Hours  17

Summer
GEOL 300  Field Geology  6
Semester Credit Hours  6

Fourth Year
Fall
OCNG 604  Ocean Observing Systems  5 3
OCNG 608  Physical Oceanography  5 3
Select one of the following:  3 3
American history (p. 25)
Government/Political science (p. 25)
Select one from:
OCNG 620  Biological Oceanography
OCNG 630  Geological Oceanography
OCNG 640  Chemical Oceanography
Social and behavioral sciences (p. 25)  3
Semester Credit Hours  15

Spring
OCNG 603  Communicating Ocean Science  3
OCNG 657  Data Methods and Graphical Representation in Oceanography  6
Select one of the following:  3 3
American history (p. 25)
Government/Political science (p. 25)
Select one from:
OCNG 620  Biological Oceanography
OCNG 630  Geological Oceanography
OCNG 640  Chemical Oceanography
Technical elective  4 3
Semester Credit Hours  15
Total Semester Credit Hours  132
Fifth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Advanced specialized OCNG graduate courses</td>
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</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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</tr>
<tr>
<td>Spring</td>
<td>OCNG 661 Advanced Oceanographic Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>and Communication</td>
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</tr>
<tr>
<td></td>
<td>Advanced specialized OCNG graduate courses</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>18</td>
</tr>
</tbody>
</table>

1. Any of the required courses may be taken during the Summer Sessions to diminish the heavy semester loads during Years Two and Three.

2. A second W course is required. GEOL 312 is offered as a W option when taught by Dr. Julie Newman, and other GEOL electives also fulfill the W requirement (including GEOL 491 when arranged with the permission of the instructor).

3. Students must complete 6 credit hours of American history and 6 credit hours of government/political science.

4. Select in consultation with advisor.

5. Two graduate courses will be taken for dual undergraduate/graduate credit.

6. Students will not be permitted to receive credit for both the 400- and 600-level versions of certain courses because the content and learning outcomes are too similar (e.g., OCNG 410/OCNG 608, OCNG 440/OCNG 640).

**Geophysics - BS**

Graduates with a BS in Geophysics go on to careers in the energy and environmental industries, and advanced study at top-ranked graduate programs. The first two years are similar to the BS in Geology, providing students with the fundamentals of geology, chemistry, physics, and mathematics. Courses during the junior and senior years emphasize knowledge transfer from the fields of math and physics to techniques and problems in both theoretical and applied geophysics. Technical electives allow students to focus on specific career objectives. Students are also encouraged to become involved in research problems with faculty members and can receive course credit for this activity through research hours (GEOP 291 and GEOP 491).

While graduates from the Geophysics program will have employment opportunities in industry, the rigor of this degree is designed to prepare students for advanced study. The MS degree is generally considered to be the preferred entry degree for professionals in the petroleum industry. Students interested in teaching in a university or research in an academic, government or industrial laboratory should seek the PhD.

To remain in satisfactory academic standing, students must maintain a 2.0 or better GPR in all technical courses (geology, geophysics, chemistry, math and physics). Some courses in geophysics require field trips. Students must pay expenses incurred on such trips.

Geophysicists contribute to the field of environmental science by working on traditional and emerging methods used for hydrogeological, structural and stratigraphic characterization of the uppermost 100 meters, with applications to shallow resource and groundwater assessment and the solution of environmental and engineering problems. Environmental geophysicists typically work as independent environmental consultants or with industrial corporation or government agencies. Other recommended classes include GEOL 410, GEOL 420 and GEOL 440.

Many geophysicists find eventual employment in the petroleum industry, in which reflection seismology is the primary subsurface exploration tool. Students aiming for this field will supplement their background in seismic theory with electives that focus on subsurface structures and processes and industry techniques. These students will be prepared for graduate study, as well as service jobs in the oil and gas industry between their undergraduate and graduate education. Additional recommended classes include GEOL 306, GEOL 404 and PETE 311. Qualified students may also take related graduate courses during the senior year, including GEOP 629, GEOP 631 and GEOP 620. Students interested in seismic theory may take additional math classes, such as MATH 417, MATH 407 and MATH 414.

**Program Requirements**

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering  4</td>
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<td>&amp; CHEM 117</td>
<td>Students and General Chemistry for Engineering  5</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric  3</td>
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<td>MATH 151</td>
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<td>GEOL 150</td>
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<td>GEOL 180</td>
<td>Introduction to Geology and Geophysics  1</td>
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<tr>
<td>GEO 152</td>
<td>History of the Earth  4</td>
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<td>MATH 152</td>
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<td>American history (p. 25)  3</td>
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<td>Government/Political science (p. 25)  3</td>
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<td>Communication elective (p. 22)  3</td>
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<td>Total Semester Credit Hours  14</td>
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<tr>
<td>Second Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>GEO 203</td>
<td>Mineralogy  4</td>
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<td>GEO 210</td>
<td>Geological Communication  3</td>
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<td>MATH 251</td>
<td>Engineering Mathematics III  3</td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics  4</td>
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<td>Total Semester Credit Hours  14</td>
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<tr>
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<td></td>
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<tr>
<td>GEO 304</td>
<td>Igneous and Metamorphic Petrology  4</td>
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<tr>
<td>GEO 250</td>
<td>Geological Field Methods  4</td>
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<td>MATH 308</td>
<td>Differential Equations  3</td>
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<td>Electricity and Optics  4</td>
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<tr>
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<td>Total Semester Credit Hours  15</td>
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</table>
Geology - Minor

A minor in Geology requires 15 hours of Geology or Geophysics courses, and may be especially beneficial to students majoring in fields that deal directly or indirectly with geological processes. These include agriculture, anthropology, archaeology, architecture, business, education, engineering, and soil science, to name a few.

Geophysics - Minor

A minor in Geophysics requires 15 hours of Geology or Geophysics courses, with a minimum of 9 hours in Geophysics. The minor in geophysics may be especially useful to those in related technical fields who wish to apply their skills to problems in Earth science, such as mathematics, physics, and to those whose careers naturally intersect with the physics of earth materials, such as petroleum and civil engineering.

Department of Oceanography

Studies in Oceanography

Oceanography is an interdisciplinary science that focuses on the oceans, their contents and their boundaries. Degree programs include BS in Oceanography, MS (thesis option) in Oceanography, PhD in Oceanography and a Master of Ocean Science and Technology (MOST)
a non-thesis professional degree. In addition, qualified undergraduate students may participate in a 15-credit minor in Oceanography.

The BS in Oceanography provides students with an interdisciplinary education and training in one of three areas of ocean science: Ocean Observing Systems and Technology (OOST), Ocean Climate (OC) and Marine Ecosystem Science and Health (MESH). All students will gain skill in handling, evaluating and analyzing large datasets.

The Department of Oceanography also has Fast Track 5 year Bachelor's/MOST Programs in conjunction with Environmental Geosciences, Atmospheric Sciences and Geology. These Fast Track Programs offer motivated and exceptional students the opportunity to achieve aspirations in an efficient program at Texas A&M, completing a Bachelor’s degree in one of these majors: Environmental Geosciences (B.S.), Meteorology (B.S.), Geology (B.S. or B.A.) and the Master of Ocean Science and Technology degree in 5 years. There are only two courses used for dual credit in this program. There is a total of 150 hours of coursework. The concurrent degree program enables these motivated students to coordinate the required B.S coursework (114 undergraduate credit hours plus 6 dual credit graduate courses) and MOST coursework (36 credit hours including the 6 dual credit graduate courses) to complete the required credit hours for each degree without diminishing scope or quality of work over 5 years

Faculty

Baldauf, Jack G, Professor
Oceanography
PHD, University of California, Berkeley, 1985

Brooks, David A, Professor
Oceanography
PHD, University of Miami, 1975

Campbell, Lisa, Professor
Oceanography
PHD, State University of New York at Stony Brook, 1985

Chang, Ping, Professor
Oceanography
PHD, Princeton University, 1988

Chapman, Piers, Professor
Oceanography
PHD, University of Wales, UK, 1983

Dimarco, Steven F, Professor
Oceanography
PHD, The University of Texas at Dallas, 1991

Fitzsimmons, Jessica N, Assistant Professor
Oceanography
PHD, Massachusetts Institute of Technology, 2013

Gardner, Wilford D, Professor
Oceanography
PHD, Massachusetts Institute of Technology, 1978

Giese, Benjamin S, Professor
Oceanography
PHD, University of Washington, 1989

Gold Bouchot, Gerardo, Professor
Oceanography
PHD, CINVESTAV Merida, 1991

Hetland, Robert D, Professor
Oceanography
PHD, Florida State University, 1999

Knap, Anthony H, Professor
Oceanography
PHD, University of South Hampton, 1978

Orsi, Alejandro H, Professor
Oceanography
PHD, Texas A&M University, 1993

Potter, Henry, Visiting Assistant Professor
Oceanography
PHD, University of Miami, 2014

Richardson, Mary J, Professor
Oceanography
PHD, Massachusetts Institute of Technology, 1980

Shamberger, Kathryn E, Assistant Professor
Oceanography
PHD, University of Washington, 2011

Slowey, Niall C, Professor
Oceanography
PHD, Massachusetts Institute of Technology, 1991

Stoessel, Achim, Associate Professor
Oceanography
PHD, Universitat Hamburg, 1990

Sylvan, Jason B, Assistant Professor
Oceanography
PHD, Rutgers, The State University of New Jersey, 2008

Thomas, Deborah J, Professor
Oceanography
PHD, University of North Carolina at Chapel Hill, 2002

Thornton, Daniel C, Associate Professor
Oceanography
PHD, Queen Mary Westfield College, University of London, 1996

Thyng, Kristen M, Research Assistant Professor
Oceanography
PHD, Texas A&M University, 2012

Wiederwohl, Christina L, Instructional Assistant Professor
Oceanography
PHD, Texas A&M University, 2012

Yvon-Lewis, Shari A, Professor
Oceanography
PHD, University of Miami, 1994

Zhang, Yige, Assistant Professor
Oceanography
PHD, Yale University, 2015
The Department of Oceanography offers a BS in Oceanography. The BS in Oceanography provides students with an interdisciplinary education and training in one of three areas of ocean science: Ocean Observing Systems and Technology (OOST), Ocean Climate (OC) and Marine Ecosystem Science and Health (MESH). All students will gain skill in handling, evaluating and analyzing large datasets. The BS in Oceanography curriculum: 1) Provides students with an interdisciplinary understanding of the oceans and the processes affecting them for use in careers in marine science or other related fields; 2) Provides students with the skills to retrieve, evaluate, and analyze large oceanographic datasets such as those generated from long term oceanographic studies and observing systems; and 3) Emphasizes critical thinking and problem solving skills.

Students planning on attending graduate school are encouraged to also complete a minor in a STEM field. Many graduates will obtain jobs in a variety of fields including marine technical support, energy and transportation industries, insurance industries, hazard mitigation, marine operations, homeland security, oil spill response, etc.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCNG 251</td>
<td>Oceanography</td>
<td>4</td>
</tr>
<tr>
<td>&amp; OCNG 252 &amp; Oceanography Laboratory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNG 203</td>
<td>Communicating Oceanography Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>OCNG 303</td>
<td>Professional Communication in Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 410</td>
<td>Physical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 420</td>
<td>Biological Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 430</td>
<td>Geological Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 440</td>
<td>Chemical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 443</td>
<td>Oceanographic Field and Laboratory Methods</td>
<td></td>
</tr>
<tr>
<td>OCNG 456</td>
<td>MATLAB Programming for Ocean Sciences</td>
<td>3</td>
</tr>
<tr>
<td>or OCNG 469 or Python for Geosciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNG 461</td>
<td>Advanced Oceanographic Data Analysis and Communication</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 481</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>GEOS 470</td>
<td>Data Analysis Methods in Geosciences</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 101</td>
<td>Introduction to the Geosciences</td>
<td>1</td>
</tr>
<tr>
<td>Technical electives</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Concentration electives 2</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

**University and College Requirements**

**Communication**

- ENGL 104 Composition and Rhetoric 3
- COMM 203 Public Speaking 3
- or COMM 205 or Communication for Technical Professions

**Mathematics**

- MATH 151 Engineering Mathematics I 4
- MATH 152 Engineering Mathematics II 4
- STAT 211 Principles of Statistics I 3

**Life and physical sciences**

- CHEM 101 Fundamentals of Chemistry I 4
- & CHEM 111 and Fundamentals of Chemistry Laboratory I 4
- CHEM 102 Fundamentals of Chemistry II 4
- & CHEM 112 and Fundamentals of Chemistry Laboratory II 4
- BIOL 111 Introductory Biology I 4
- BIOL 112 Introductory Biology II 4
- PHYS 218 Mechanics 4
- PHYS 208 Electricity and Optics 4
- Creative arts (p. 24) 3
- Language, philosophy and culture (p. 23) 3
- Social and behavioral sciences (p. 25) 3
- American history (p. 25) 6
- POLS 206 American National Government 3
- POLS 207 State and Local Government 3

Total Semester Credit Hours 120

1 Select from OCNG 400-499 (p. 923), ATMO 201, ATMO 203, ATMO 251; BIOL 213, BIOL 214, BIOL 300-399 (p. 741); BICH 300-499 (p. 739); CHEM 300-499 (p. 752); CVEN 221; GENE 300-499 (p. 821); GEOS 442/GEOS 442; GEOS 442/GEOS 442; MATH 251; MATH 300-499 (p. 885); PHYS 221; PHYS 300-499 (p. 933); OCEN 300-499 (p. 919); STAT 212.

2 Select one of the following tracks: Ocean Climate, Ocean Observing Science and Technology, Marine Ecosystem Science and Health

**Ocean Climate Track**

- MATH 251 Engineering Mathematics III 3
- MATH 308 Differential Equations 3

Track electives 12

- ATMO 201 Weather and Climate
- ATMO 203 Weather Forecasting Laboratory
- ATMO 324 Physical and Regional Climatology
- ATMO 441 Satellite Meteorology and Remote Sensing
- GEOS 442 Past Climates
- GEOS 442
- MATH 304 Linear Algebra
- OCNG 451 Mathematical Modeling of Ocean Climate
Oceanography - Minor

Oceanography is an interdisciplinary science that focuses on the oceans, their contents and their boundaries. Degree programs are offered at the graduate level, leading to the Master of Science and the Doctor of Philosophy degrees in oceanography. In addition, various undergraduate courses are offered, and qualified undergraduate students may participate in a 15-credit minor in Oceanography. A minor consists of at least 15 hours from any of the undergraduate OCNG courses. However, only one of OCNG 251 or OCNG 401 can be used for the minor. At least 6 hours must be upper division courses in the minor.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select 15 semester credits from the following:</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Any OCNG 100 - 499</td>
<td></td>
</tr>
</tbody>
</table>

Additional Requirements:

1. Only one of OCNG 251 or OCNG 401 can be used for the minor.
2. At least 6 hours must be upper division courses.

University Studies Programs

The College of Geosciences offers degrees in University Studies. A University Studies degree differs from a traditional “major” in that it consists of a concentration of 26 hours and two minors of 15-18 hours each. The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

Majors

- Bachelor of Science in University Studies, Geographic Information Science and Technology Concentration (p. 448)
- Bachelor of Science in University Studies, Geography Concentration (p. 448)

University Studies - BS, Geographic Information Science and Technology Concentration

The broad objective of the academic discipline of geography is to understand and improve the human environment: Earth. Understanding the Earth's surface requires a consideration of both natural and social processes, hence geography is by nature interdisciplinary. Human-environment interactions are of particular interest in geography. The area of concentration in geography offers students a broad perspective on the Earth as human habitat, while permitting them to complete two supporting minors in other disciplines. The area of concentration is flexible in that numerous courses are included to permit a student to build a course of study in geography that is tailored to his or her interests. Ideally, the minors would be in related fields to build depth and breadth around themes that the student wishes to emphasize.
## Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 390</td>
<td>Principles of Geographic Information Systems</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 361</td>
<td>Remote Sensing in Geosciences</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 352/GEOL 352</td>
<td>GNSS in the Geosciences</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
<td>4</td>
</tr>
</tbody>
</table>

Select from the following: 6-8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSM 459</td>
<td>Programming for Spatial Data Applications</td>
<td></td>
</tr>
<tr>
<td>CSCE 111</td>
<td>Introduction to Computer Science Concepts and Programming</td>
<td></td>
</tr>
<tr>
<td>GEOG 232</td>
<td>Cartography and Visualization</td>
<td></td>
</tr>
<tr>
<td>GEOG 398</td>
<td>Interpretation of Aerial Photographs</td>
<td></td>
</tr>
<tr>
<td>GEOG 392</td>
<td>GIS Programming</td>
<td></td>
</tr>
<tr>
<td>GEOG 461</td>
<td>Digital Image Processing in the Geosciences</td>
<td></td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
<td></td>
</tr>
<tr>
<td>GEOG 312</td>
<td>Data Analysis in Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 479</td>
<td>Principles of Geocomputation</td>
<td></td>
</tr>
<tr>
<td>GEOG 461</td>
<td>Digital Image Processing in the Geosciences</td>
<td></td>
</tr>
</tbody>
</table>

### University and College Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Communication elective (p. 22)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Life and Physical Sciences elective (p. 22)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Language, Philosophy and Culture (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Creative Arts (p. 24)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and Behavioral Sciences (p. 25)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>American History (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>International and Cultural Diversity (p. 40)</td>
<td>1-18</td>
<td></td>
</tr>
</tbody>
</table>

Minor 1  15-18

Minor 2  15-18

Free Electives  26

Total Semester Credit Hours  120

1 A graduation requirement includes 6 hours of international and cultural diversity courses. A course satisfying a University Core category, a college/department requirement, or a free elective may be used to satisfy this requirement.

### University Studies - BS, Geography Concentration

The broad objective of the academic discipline of geography is to understand and improve the human environment: Earth. Understanding the Earth’s surface requires a consideration of both natural and social processes, hence geography is by nature interdisciplinary. Human-environment interactions are of particular interest in geography. The area of concentration in geography offers students a broad perspective on the Earth as human habitat, while permitting them to complete two supporting minors in other disciplines. The area of concentration is flexible in that numerous courses are included to permit a student to build a course of study in geography that is tailored to his or her interests. Ideally, the minors would be in related fields to build depth and breadth around themes that the student wishes to emphasize.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 462/ESSM 462</td>
<td>Advanced GIS Analysis for Natural Resources Management</td>
</tr>
<tr>
<td>GEOG 467</td>
<td>Dynamic Modeling of Earth and Environmental Systems</td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
</tr>
<tr>
<td>GEOG 476</td>
<td>GIS Practicum</td>
</tr>
<tr>
<td>GEOG 485</td>
<td>Directed Studies</td>
</tr>
<tr>
<td>GEOG 489</td>
<td>Special Topics in...</td>
</tr>
<tr>
<td>GEOG 491</td>
<td>Research</td>
</tr>
</tbody>
</table>

Select two of the following: 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 400</td>
<td>Arid Lands Geomorphology</td>
</tr>
<tr>
<td>GEOG 401</td>
<td>Political Geography</td>
</tr>
<tr>
<td>GEOG 404</td>
<td>Spatial Thinking, Perception and Behavior</td>
</tr>
<tr>
<td>GEOG 406</td>
<td>Geographic Perspectives on Contemporary Urban Issues</td>
</tr>
<tr>
<td>GEOG 420</td>
<td>Geography of Terrorism</td>
</tr>
<tr>
<td>GEOG 430</td>
<td>Environmental Justice</td>
</tr>
<tr>
<td>GEOG 434</td>
<td>Hydrology and Environment</td>
</tr>
<tr>
<td>GEOG 435</td>
<td>Principles of Plant Geography</td>
</tr>
<tr>
<td>GEOG 440</td>
<td>History and Nature of Geography</td>
</tr>
<tr>
<td>GEOG 442</td>
<td>Past Climates</td>
</tr>
<tr>
<td>GEOS 442</td>
<td>Past Climates</td>
</tr>
<tr>
<td>GEOG 450</td>
<td>Field Geography</td>
</tr>
<tr>
<td>GEOG 462/ESSM 462</td>
<td>Advanced GIS Analysis for Natural Resources Management</td>
</tr>
<tr>
<td>GEOG 467</td>
<td>Dynamic Modeling of Earth and Environmental Systems</td>
</tr>
<tr>
<td>GEOG 475</td>
<td>Advanced Topics in GIS (Geographic Information Systems)</td>
</tr>
<tr>
<td>GEOG 476</td>
<td>GIS Practicum</td>
</tr>
<tr>
<td>GEOG 485</td>
<td>Directed Studies</td>
</tr>
<tr>
<td>GEOG 489</td>
<td>Special Topics in...</td>
</tr>
<tr>
<td>GEOG 491</td>
<td>Research</td>
</tr>
</tbody>
</table>

**University and College Requirements**

Communication elective (p. 22) 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
</tr>
<tr>
<td>GEOG 213</td>
<td>Planet Earth Lab</td>
</tr>
</tbody>
</table>

Life and Physical Science electives 8

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 101 &amp; BIOL 107</td>
<td>Botany and Zoology</td>
</tr>
<tr>
<td>BIOL 111 &amp; BIOL 112</td>
<td>Introductory Biology I and II</td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 102Laboratory I</td>
<td>Fundamentals of Chemistry I and Laboratory I</td>
</tr>
<tr>
<td>CHEM 111 and Fundamentals of Chemistry II &amp; CHEM 112Laboratory II</td>
<td>Fundamentals of Chemistry II and Laboratory II</td>
</tr>
<tr>
<td>GEOL 101 &amp; GEOL 106and Historical Geology</td>
<td>Principles of Geology and Historical Geology</td>
</tr>
<tr>
<td>PHYS 201 &amp; PHYS 202</td>
<td>College Physics and College Physics</td>
</tr>
</tbody>
</table>

Language, Philosophy and Culture elective (p. 23) 3
<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Creative Arts elective (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences elective (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td>American History elective (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td>POLS 206 American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207 State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Minor 1</td>
<td>15-18</td>
</tr>
<tr>
<td>Minor 2</td>
<td>15-18</td>
</tr>
<tr>
<td>General Electives</td>
<td>18-24</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>120</td>
</tr>
</tbody>
</table>

1. GEOG 301 and GEOG 305 cannot be used in combination to meet this requirement.
2. Any 100-499 course not used elsewhere.

Two courses that meet the writing requirement are required.

A total of six semester credit hours must include courses that meet the International and Cultural Diversity (p. 40) requirements, except sections of BUSN 289 that meet the university writing requirement.
COLLEGE OF LIBERAL ARTS

Administrative Officers
Dean - Pamela R. Matthews, Ph.D.
Associate Dean - Patricia A. Hurley, Ph.D.
Associate Dean - Steven M. Oberhelman, Ph.D.
Associate Dean - Gerianne Alexander, Ph.D.
Associate Dean - Leroy Dorsey, Ph.D.
Associate Dean - Srividya Ramasubramanian, Ph.D.
Associate Dean - Paul Wellman, Ph.D.
Assistant Dean - Cheryl L. Hanks, M.A.

General Statement
The College of Liberal Arts offers students an opportunity to explore the intellectual achievements of humankind through a disciplined and responsible study of issues that have been of enduring importance to people. Thus, courses in liberal arts help students develop a sensitivity to the questions and values that confront them in their daily lives. At the same time, skills are built which can be put to use in solving complex problems. One of the program’s principal objectives is to achieve the hallmark of an educated person: a fundamental knowledge of the forces that have shaped and continue to direct our cultural identity.

The purpose of the undergraduate program in the College of Liberal Arts is to foster independent thinking by offering students a broad education. To achieve this, the college supports the aims of the University Core Curriculum, which requires all students to engage in specific studies intended to promote an awareness of their heritage, their culture, and their environment. Students who choose to major in one of the Liberal Arts disciplines will complete a curriculum designed to promote this breadth of understanding while providing a focus through concentration in one specific area of study.

The first two years of undergraduate study in the College of Liberal Arts introduce students to the full range of arts, humanities, science, mathematics and social science areas that are established in the University Core Curriculum. During the last two years, students concentrate on their major and minor fields of study and complete their program with appropriate elective hours. Throughout the program, skills in critical thinking and in communication are developed, strengthened and polished.

Many graduates with bachelor’s degrees in liberal arts continue their study at the graduate level in an academic discipline or in a profession such as medicine or law. The majority go directly into the job market. Studies have shown that liberal arts graduates are very successful in a variety of activities in commerce, business, or public service because the knowledge and skills sets in critical thinking, communication, writing, problem-solving, and analytical thinking they have developed are valuable in today’s world. Many businesses actively recruit liberal arts majors. Whether as a foundation for further study or as a broad education preparatory to positions in business, industry, and the public domain, a liberal arts degree has intrinsic worth and enduring value in providing knowledge for life.

General Degree Requirements
Degree requirements for Liberal Arts majors are organized into:

1. General Requirements, including University Core Curriculum requirements and College of Liberal Arts requirements
2. Requirements of the Major Field of Study
3. Requirements of the Minor Field of Study
4. Electives

A minimum of 120 acceptable hours of coursework is required for the baccalaureate degree. A minimum of 36 hours of 300- or 400-level coursework must be completed at Texas A&M University.

General Requirements
The areas listed below include University Core Curriculum requirements and College of Liberal Arts requirements. The completion of requisite hours in these areas will thus satisfy both University Core Curriculum and college requirements.

Bachelor of Arts Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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</tbody>
</table>

Literature in English
Select two of the following: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ENGL 202</td>
<td>Environmental Literature</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
</tr>
<tr>
<td>ENGL 204/ AFST 204</td>
<td>Introduction to African-American Literature</td>
</tr>
<tr>
<td>ENGL 205/ AFST 205</td>
<td>Introduction to Africana Literature</td>
</tr>
<tr>
<td>ENGL 206</td>
<td>Twenty-first Century Literature and Culture</td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Shakespeare</td>
</tr>
<tr>
<td>ENGL 219</td>
<td>Literature and the Other Arts</td>
</tr>
<tr>
<td>ENGL 221/ MODL 221</td>
<td>World Literature</td>
</tr>
<tr>
<td>ENGL 222/ MODL 222</td>
<td>World Literature</td>
</tr>
<tr>
<td>ENGL 227</td>
<td>American Literature: The Beginnings to Civil War</td>
</tr>
<tr>
<td>ENGL 228</td>
<td>American Literature: Civil War to Present</td>
</tr>
<tr>
<td>ENGL 231</td>
<td>Survey of English Literature I</td>
</tr>
<tr>
<td>ENGL 232</td>
<td>Survey of English Literature II</td>
</tr>
<tr>
<td>ENGL 313</td>
<td>Medieval English Literature</td>
</tr>
<tr>
<td>ENGL 314</td>
<td>The English Renaissance</td>
</tr>
<tr>
<td>ENGL 315</td>
<td>Seventeenth-Century Literature</td>
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<td>Beginning Spanish II</td>
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Select one of the following:

- **ARAB 201** Intermediate Arabic I
- **& ARAB 202** and Intermediate Arabic II
- **CHIN 201** Intermediate Chinese I
- **& CHIN 202** and Intermediate Chinese II
- **CLAS 211** Intermediate Greek
  - or **CLAS 311** or Advanced Greek: New Testament
  - or **CLAS 312** or Advanced Classical Greek Poetry
  - or **CLAS 313** or Advanced Classical Greek Prose
- **CLAS 221** Intermediate Latin I
- **& CLAS 222** and Intermediate Latin II
- **FREN 201** Intermediate French I
  - & **FREN 202** and Intermediate French II
  - or **FREN 221** or Field Studies I and Field Studies
  - & **FREN 222**
- **GERM 201** Intermediate German I
  - & **GERM 202** and Intermediate German II
  - or **GERM 301** or Field Studies I and Field Studies
  - & **GERM 302**
- **ITAL 201** Intermediate Italian I
  - & **ITAL 202** and Intermediate Italian II
- **JAPN 201** Intermediate Japanese I
  - & **JAPN 202** and Intermediate Japanese II
- **RUSS 201** Intermediate Russian I
  - & **RUSS 202** and Intermediate Russian II
  - or **RUSS 221** or Field Studies I and Field Studies
  - & **RUSS 222**
- **SPAN 201** Intermediate Spanish I
  - & **SPAN 202** and Intermediate Spanish II
  - or **SPAN 221** or Field Studies Abroad I and
  - & **SPAN 222** Field Studies Abroad II

**Option 2**

Foreign language placement test results determine foreign language course levels required 3

**Option 3**

Advanced Placement or Reading Achievement foreign language test results determine foreign language course levels required 3

**Mathematics**

Mathematics (3 hours must be in MATH) (p. 22) 6

**Life and Physical Sciences**

Life and physical sciences elective (p. 22) 9

**Creative Arts and Language, Philosophy and Culture** 4

Creative arts elective (p. 24) 6

Language, philosophy and culture elective (p. 23) 3

Language, philosophy and culture or creative arts (p. 23) 3

**Social and Behavioral Sciences**

Social and behavioral sciences elective (p. 25) 4

**American History**

American history elective (p. 25) 6

### Bachelor of Science Requirements

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<th>Semester Credit Hours</th>
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<td>Composition and Rhetoric</td>
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Select one of the following:

- **ENGL 203** Writing about Literature
- **ENGL 210** Technical and Business Writing
- **COMM 203** Public Speaking
- **COMM 205** Communication for Technical Professions
- **COMM 243** Argumentation and Debate

### Literature in English

Select two of the following: 6

- **ENGL 202** Environmental Literature
- **ENGL 203** Writing about Literature 2
- **ENGL 204** Introduction to African-American Literature
- **AFST 204** Literature
- **ENGL 205** Introduction to Africana Literature
- **AFST 205**
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**Foreign Language**

Select one of the following:

- ARAB 101 Beginning Arabic I
- ARAB 102 Beginning Arabic II
Total Semester Credit Hours 74

1 Students must demonstrate the ability to express themselves in acceptable written English. The College requirement is satisfied if a student earns a grade of C or better in ENGL 203. Students who do not meet this standard must repeat the course prior to completing 60 hours and earn a grade of C or better or must immediately arrange with the director of the writing laboratory to be certified as competent in writing.

2 ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but will not count toward both requirements.

3 Two years of high school foreign language may be used to satisfy this requirement unless specified by major.

4 No course used to fulfill this requirement may fulfill any other college or university requirement except in the minor field of study.

5 Minimum of 3 and maximum of 6 semester credit hours in Creative Arts.

6 Courses in military, air or naval science may not be substituted for required courses.

7 The list of approved courses is available in the degree audit for each major.

Major Field of Study

Each department sets its own requirements for the major, including no fewer than 27 hours of coursework and no more than 33 hours (except for the BA in Music). At least 12 semester hours in the major must be completed in advanced courses (300- and 400-level), and at least 12 semester hours in the major field must be completed in residence at Texas A&M. A grade of C or higher is required in a course to be counted toward the major.

Minor Field of Study

Completion of a minor is not a requirement of the College of Liberal Arts; however, individual departments may require their majors to have a minor. Students should consult with an advisor in their major department to determine if a minor is required. The minor program comprises 15–18 hours with a minimum of 6 hours in residence at the 300- to 400-level. Minor programs are recognized on the transcript after graduation, but not on the diploma. A grade of C or higher is required if a course is to be counted toward the minor field. Each student who is required to complete a minor, or who chooses to do so, should contact the department that offers the minor to determine which specific courses are mandated. The student’s college and/or major department determines the number of minor programs a student may seek and shall be responsible for advising after the student receives signed approval from the department, program, or college granting the minor program.

Electives

To enhance the traditionally broad background of the liberal arts graduate, undergraduate students are allowed to include in their degree program a minimum of 9 semester hours of free elective courses. These courses may be chosen from any field within the University except from a program a minimum of 9 semester hours of free elective courses. These courses may be chosen from any field within the University except from a program a minimum of 9 semester hours of free elective courses. These courses may be chosen from any field within the University except from a program a minimum of 9 semester hours of free elective courses. These courses may be chosen from any field within the University except from a program a minimum of 9 semester hours of free elective courses. These courses may be chosen from any field within the University except from a program a minimum of 9 sememeter credit hours in Creative Arts.

5 Minimum of 3 and maximum of 6 semester credit hours in Creative Arts.

6 Courses in military, air or naval science may not be substituted for required courses.

7 The list of approved courses is available in the degree audit for each major.

Major Field of Study

Each department sets its own requirements for the major, including no fewer than 27 hours of coursework and no more than 33 hours (except for the BA in Music). At least 12 semester hours in the major must be completed in advanced courses (300- and 400-level), and at least 12 semester hours in the major field must be completed in residence at Texas A&M. A grade of C or higher is required in a course to be counted toward the major.

Minor Field of Study

Completion of a minor is not a requirement of the College of Liberal Arts; however, individual departments may require their majors to have a minor. Students should consult with an advisor in their major department to determine if a minor is required. The minor program comprises 15–18 hours with a minimum of 6 hours in residence at the 300- to 400-level. Minor programs are recognized on the transcript after graduation, but not on the diploma. A grade of C or higher is required if a course is to be counted toward the minor field. Each student who is required to complete a minor, or who chooses to do so, should contact the department that offers the minor to determine which specific courses are mandated. The student’s college and/or major department determines the number of minor programs a student may seek and shall be responsible for advising after the student receives signed approval from the department, program, or college granting the minor program.

Electives

To enhance the traditionally broad background of the liberal arts

6 Course in military, air or naval science may not be substituted for required courses.

7 The list of approved courses is available in the degree audit for each major.

8 The College requirement is satisfied if a student earns a grade of C or better in ENGL 203. Students who do not meet this standard must repeat the course prior to completing 60 hours and earn a grade of C or better or must immediately arrange with the director of the writing laboratory to be certified as competent in writing.

9 ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but will not count toward both requirements.

10 Two years of high school foreign language may be used to satisfy this requirement unless specified by major.

11 No course used to fulfill this requirement may fulfill any other college or university requirement except in the minor field of study.
Courses offered only on an S/U basis may be taken by freshmen and sophomores. These courses count toward the 12 semester credit hour limit.

**Combined Degree Plan, Double Degree and Double Major**

Students may pursue a program to qualify for two bachelor’s degrees, either a Bachelor of Arts and a Bachelor of Science degree from different departments, or two Bachelor of Arts or two Bachelor of Science degrees, with the second degree from another college. Alternatively, instead of a major and a minor field, students in the College of Liberal Arts may elect to have two Liberal Arts major fields of study. Both majors may be within the college, or one major may be outside the college, provided both majors lead to the same baccalaureate degree.

Students who are enrolled in a University Studies degree are not eligible for a double major or a double degree.

Students must declare the double degree no later than the semester in which they will complete 90 hours. Students must have and maintain at least a 3.0 GPR cumulative and in the majors (or the minimum departmental GPR requirement in the major, whichever is higher), with at least a 3.0 GPR in at least 9 hours in the second field of study at the time of declaration. Before declaring the double degree, students should consult with the appropriate advisors to formulate the combined degree plan. The following requirements must be met: the student must

1. satisfy all University and college requirements
2. complete all required courses in each major, if both majors are in the College of Liberal Arts (i.e., take all courses that are specifically listed in each regular degree program)
3. in cases where one major is in the College of Liberal Arts and the other major is in another college, the student shall take in his or her liberal arts major field of study the same number of credit hours required of regular majors in that field and also satisfy whatever conditions are set by the other college for its major field

Candidates for a double bachelor’s degree must have been in residence at least two academic years and must complete all essential work of the second curriculum not covered in the first. To qualify for the double degree, the student must complete a minimum of 30 semester credit hours more than the higher number of semester credit hours required for either degree.

**Curricular Options**

**International and Intercultural Experiences**

The International and Cultural Diversity requirement encourages all students to learn about attitudes and cultures different from their own. All students are required to select from a list of approved courses that foster greater awareness of our interdependent and diverse world.

Students also may select, as free electives, courses which address cultural diversity issues in the United States. Courses in this area encourage students to focus on issues of race, ethnicity and gender and to develop a broader understanding of the diverse cultures and traditions in the United States.

Further opportunity to increase international and national intercultural awareness can be accomplished through study abroad and internship programs. More information on these programs is available through the Undergraduate Programs Office in the College of Liberal Arts.

**Liberal Arts Honors Program**

The College of Liberal Arts encourages qualified majors to participate in its Honors Program, which is designed for academically talented high school graduates who have distinguished secondary school records (top 10%) and high scores on achievement tests (1250 SAT or 28 ACT). Students may also become Honors eligible once they establish a Texas A&M GPA of at least 3.5.

Students accepted into the program take courses that foster an interdisciplinary outlook characteristic of the Liberal Arts and that synthesize knowledge from other courses. Participants work in small classes with some of the most distinguished faculty at Texas A&M University. Students develop their own interests and have the option to write an honors thesis under the direct supervision of a professor with whom they have chosen to work. For information about Texas A&M Honors Program and Fellows Program (i.e., the senior thesis), see the Honors and Undergraduate Research (http://honors.tamu.edu) website. Individual departments may have their own Honors program for their majors.

**Interdisciplinary Minors**

Interdisciplinary minors are offered in Africana Studies, Asian Studies, Comparative Cultural Studies, Film Studies, Hispanic Studies for Community Engagement, Journalism Studies, Latino/a Mexican American Studies, Religious Studies, and Women’s and Gender Studies. Specific course requirements and options are available from each interdisciplinary program director.

**Cooperative Education Program**

Cooperative education enables students to gain practical work experience and a salary while completing academic requirements. During the four-year academic program, co-op students complete two to four periods of work away from campus, gaining experience through on-the-job training and thus improving their opportunities for future employment. An advisor in the cooperative education office provides additional information about this program.

**Government Service (MPA Programs)**

Most graduate programs in public administration recommend a broad background of knowledge and skills in the following areas: the political, social, economic and legal context of administration; analytical tools; individual, group and organizational dynamics; policy analysis; administrative/management processes; and arts and science foundation skills. Students are best prepared for an MPA program if their undergraduate programs are multidisciplinary in nature, drawing upon political science, economics, the behavioral sciences, the quantitative sciences, and administrative and managerial sciences.

**Law**

Most law school admissions committees require a student to have a baccalaureate degree, or equivalent, as well as an acceptable score on the Law School Admissions Test (LSAT). In general, law schools prefer that a student seek a diverse college education rather than one which is narrowly specialized. They favor thorough learning in some broad cultural field of a student’s choice, such as history, economics, political science, philosophy, mathematics, science, literature, or the classics. Admissions committees rarely favor concentration in specialized, technical curricula unless such study is adequately supplemented by advanced work in the social sciences and humanities. The Law School Admissions Test Council and the Council of the Section on Legal Education and Admissions of the American Bar Association both advise against the
taking of satisfactory/unsatisfactory courses by students intending to go to law school.

The college now offers a University Studies degree with a concentration in pre-law (B.A. in Society, Ethics and Law). Advising for pre-law students regardless of major, including application forms for taking the Law School Admissions Test, may be obtained from the Office of Professional School Advising.

**Medicine**

Advising for all pre-health students, including medical and dental students, may be obtained from the Office of Professional School Advising. Students are urged to stop by the office to pick up information on professional schools and talk with an advisor very early in their collegiate career.

**Teacher Certification**

Students majoring in one of the departments of the College of Liberal Arts and working toward a teaching certificate must meet the minimum requirements described in the College of Education and Human Development section under secondary teacher certification. Because many certification requirements are determined by the State of Texas and thus are subject to periodic change, students working toward certification should maintain frequent contact with advisors in the College of Education and Human Development.

**Theology**

The American Association of Theological Schools recommends that students planning to enter a theological seminary include in their undergraduate curriculum the following subjects.

- English (6 semesters)
- History (3 semesters)
- Philosophy (3 semesters)
- Natural science (2 semesters)
- Social science (6 semesters)
- Foreign language (4 semesters): Latin, German or French
- Religion (3 semesters).

Courses taught at Texas A&M in religion include:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
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<td>ENGL 365/REL 360</td>
<td>The Bible as Literature</td>
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<td>HUMA 211/RELS 211</td>
<td>Hebrew Scriptures</td>
<td>3</td>
</tr>
<tr>
<td>HUMA 213/RELS 213</td>
<td>New Testament</td>
<td>3</td>
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<td>HUMA 303/RELS 303</td>
<td>Near Eastern Religions</td>
<td>3</td>
</tr>
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<td>HUMA 304/RELS 304</td>
<td>Indian and Oriental Religions</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 331/RELS 331</td>
<td>Philosophy of Religion</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 326/RELS 326</td>
<td>Sociology of Religion</td>
<td>3</td>
</tr>
</tbody>
</table>

For more information, see the Director of the Religious Studies Program in the college.

**The English Language Institute**

The English Language Institute (ELI) offers a comprehensive program designed to help international students improve their English language ability. The goal of the English Language Institute is to provide the necessary language and cultural skills for international students to enter and participate in academic programs at Texas A&M. This intensive English program facilitates international students’ participation in technology, science and management. Enriched by the arts and humanities, the program serves current and future University students and emphasizes diversity and excellence.

Full-time ELI admitted students receive 25 hours of instruction per week, while part-time admitted students take from 3 to 12 or more hours per week. ELI classes meet on a regular University semester schedule in classrooms on the Texas A&M campus.

The ELI uses the most current textbooks, supplementary materials, language learning equipment and instructional techniques in the field of language learning. Courses emphasize listening and reading comprehension, fluency in speaking and writing, and the development of pronunciation skills, vocabulary and grammar. Courses are offered at beginning (100), intermediate (200), and advanced (300) levels. In addition, 500-level courses in oral skills prepare graduate students to serve as teaching assistants, while 500-level courses in composition teach preparation for thesis and dissertation writing. For more information, contact the ELI Office at (979) 845-7936.

**Majors**

**College of Liberal Arts**

- Bachelor of Arts in Women’s and Gender Studies (p. 474)
- Bachelor of Arts in University Studies, Journalism Studies Concentration (p. 560)
- Bachelor of Arts in University Studies, Race, Gender, Ethnicity Concentration (p. 561)
- Bachelor of Arts in University Studies, Religious Thought, Practices and Cultures Concentration (p. 563)
- Bachelor of Arts in University Studies, Society, Ethics and Law Concentration (p. 564)
- Bachelor of Science in University Studies, Health Humanities Concentration (p. 565)
- Bachelor of Science in University Studies, Liberal Arts Concentration (p. 566)
- Bachelor of Science in University Studies, Race, Gender, Ethnicity Concentration (p. 567)

**Department of Anthropology**

- Bachelor of Arts in Anthropology, General Track (p. 486)
- Bachelor of Arts in Anthropology, Archaeology Track (p. 485)

**Department of Communication**

- Bachelor of Arts in Communication (p. 489)
- Bachelor of Arts in Telecommunication Media Studies (p. 490)
- Bachelor of Science in Telecommunication Media Studies (p. 492)

**Department of Economics**

- Bachelor of Arts in Economics (p. 497)
• Bachelor of Arts in Economics (p. 497) and Master of International Affairs, 5-Year Degree Program (p. 498)
• Bachelor of Arts in Economics (p. 497) and Master of Public Service and Administration, 5-Year Degree Program (p. 499)
• Bachelor of Science in Economics (p. 498)
• Bachelor of Science in Economics (p. 498) and Master of International Affairs, 5-Year Degree Program (p. 500)
• Bachelor of Science in Economics (p. 498) and Master of Public Service and Administration, 5-Year Degree Program (p. 501)
• Bachelor of Science in Economics and Master of Science in Economics, 5-Year Degree Program (p. 502)

Department of English
• Bachelor of Arts in English (p. 507)
• Bachelor of Arts in English, Middle School Teaching Certification (p. 508)

Department of Hispanic Studies
• Bachelor of Arts in Spanish (p. 511)

Department of History
• Bachelor of Arts in History (p. 516)

Department of International Studies
• Bachelor of Arts in Classics, Classical Civilization Track (p. 519)
• Bachelor of Arts in Classics, Language and Literature Track (p. 520)
• Bachelor of Arts in International Studies, International Commerce Track (p. 522)
• Bachelor of Arts in International Studies, International Communication and Media Track (p. 524)
• Bachelor of Arts in International Studies, International Environmental Studies Track (p. 525)
• Bachelor of Arts in International Studies, International Geographic Information Systems Track (p. 527)
• Bachelor of Arts in International Studies, Global Cultural Studies Track (p. 520)
• Bachelor of Arts in International Studies, International Politics and Diplomacy Track (p. 529)
• Bachelor of Arts in International Studies and Master of Public International Affairs, 5-Year Degree Program (p. 530)
• Bachelor of Arts in Modern Languages, French Option (p. 532)
• Bachelor of Arts in Modern Languages, German Option (p. 533)
• Bachelor of Arts in Modern Language, Russian Option (p. 534)

Department of Performance Studies
• Bachelor of Arts in Performance Studies (p. 539)

Department of Philosophy and Humanities
• Bachelor of Arts in Philosophy (p. 541)

Department of Political Science
• Bachelor of Arts in Political Science (p. 545)
• Bachelor of Science in Political Science (p. 546)

• Bachelor of Arts in Political Science and Master of Public Service and Administration, 5-Year Degree Program (p. 546)
• Bachelor of Science in Political Science and Master of Public Service and Administration, 5-Year Degree Program (p. 547)

Department of Psychology
• Bachelor of Arts in Psychology (p. 550)

Department of Sociology
• Bachelor of Arts in Sociology (p. 555)
• Bachelor of Science in Sociology (p. 557)
• Bachelor of Arts in Sociology and Master of Public Service and Administration, 5-Year Degree Program (p. 556)
• Bachelor of Science in Sociology and Master of Public Service and Administration, 5-Year Degree Program (p. 557)

Minors

College of Liberal Arts
• Africana Studies Minor (p. 477)
• Comparative Cultural Studies-International Minor (p. 478)
• Comparative Cultural Studies-U.S. Minor (p. 479)
• Film Studies Minor (p. 480)
• Global Culture and Society Minor (p. 480)
• Journalism Minor (p. 480)
• Leadership Minor (p. 481)
• Liberal Arts Honors Minor (p. 481)
• Religious Studies Minor (p. 482)
• Women’s and Gender Studies Minor (p. 483)

Department of Anthropology
• Anthropology Minor (p. 487)

Department of Communication
• Communication Minor (p. 493)

Department of Economics
• Economics Minor (p. 503)

Department of English
• English Minor (p. 510)

Department of Hispanic Studies
• Hispanic Studies for Community Engagement Minor (p. 513)
• Spanish Minor (p. 514)

Department of History
• History Minor (p. 517)

Department of International Studies
• Arabic Studies Minor (p. 535)
• Asian Studies Minor (p. 535)
• Chinese Minor (p. 536)
• Classical Studies Minor (p. 536)
• French Minor (p. 537)
• German Minor (p. 537)
• Italian Minor (p. 537)
• Japanese Minor (p. 538)
• Russian Minor (p. 538)

Department of Performance Studies
• Performance Studies Minor (p. 540)
• Performance Technology Minor (p. 540)

Department of Philosophy
• Philosophy Minor (p. 542)

Department of Psychology
• Psychology Minor (p. 552)

Department of Sociology
• Latino/a and Mexican-American Studies Minor (p. 559)
• Sociology Minor (p. 559)

Certificates

College of Liberal Arts
• Diversity Certificate (p. 484)

Department of Communication
• Communication and Global Media Certificate (p. 494)
• Communication Leadership and Conflict Management Certificate (p. 494)
• Health Communication Certificate (p. 494)
• Strategic Communication Certificate (p. 495)

Department of Economics
• Business Economics Certificate (p. 504)
• Quantitative Economic Methods (p. 504)

Department of Philosophy and Humanities
• Philosophy Pre-Law Certificate (p. 542)

Department of Psychology
• Applied Behavioral Health Certificate (p. 552)
• Healthy Development Certificate (p. 553)
• Psychology of Diversity Certificate (p. 553)
• Work and Organizations Certificate (p. 553)

Masters

Department of Anthropology
• Master of Arts in Anthropology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/anthropology/ma)
• Master of Science in Maritime Archaeology and Conservation (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/anthropology/maritime-archaeology-conservation/ms)

Department of Communication
• Master of Arts in Communication (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/communication/ma)

Department of Economics
• Master of Science in Economics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/economics/ms)

Department of English
• Master of Arts in English (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/english/ma)

Department of Hispanic Studies
• Master of Arts in Hispanic Studies (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/hispanic-studies/ma)

Department of History
• Master of Arts in History (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/history/ma)

Department of Performance Studies
• Master of Arts in Performance Studies (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/performance-studies/ma)

Department of Philosophy and Humanities
• Master of Arts in Philosophy (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/philosophy-humanities/ma)

Department of Political Science
• Master of Arts in Political Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/political-science/ma)

Department of Psychology
• Master of Science in Psychology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/psychology/ms)

Department of Sociology
• Master of Science in Sociology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/sociology/ms)

Doctoral

Department of Anthropology
• Doctor of Philosophy in Anthropology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/liberal-arts/anthropology/phd)
Women's and Gender Studies - BA

Women's and Gender Studies is a flexible interdisciplinary program devoted to the critical analysis of gender and the pursuit of knowledge about women throughout history and around the world. Combining the methods and insights of traditional liberal arts disciplines with the special insights of scholarship on women's and gender studies, our courses yield fresh perspectives on the nature of gender as it intersects with race, ethnicity, class, religion, and nation, and encourage students to look beyond their own culture and era in examining gender's role in shaping society. Through interdisciplinary breadth and an emphasis on critical thinking, women's and gender studies prepares students to employ critical learning in their private lives as well as in public roles as citizens and members of a diverse and complex workforce.

Majors in women's and gender studies receive training in both humanities and social sciences approaches and are required to complete coursework that focuses on material beyond dominant U.S. culture; core courses have both theoretical and applied focuses. In addition, majors pursue a strong liberal arts education and complete a minor in another disciplinary or interdisciplinary area, enhancing career options and enabling students to complement their work in the major and further their educational objectives by gaining detailed knowledge of a second area.

Since gender has far-reaching influence on daily life, world culture, and public policy, this major equips students to enter a wide range of fields. As a liberal arts degree, women's and gender studies is attractive to employers looking for recruits trained in critical thinking, organizational skills, reading, writing, and presenting in a wide range of subject areas. Expertise in women's and gender issues is increasingly important to businesses, governmental agencies, and other organizations dealing with matters such as sexual harassment, flex-time, parental leave, and pay equity, just as specialists in women's and gender studies find opportunities in education, law, health care, social work, counseling, media, public policy, and a wide range of other fields.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>WGST 200</td>
<td>Introduction to Women's and Gender Studies</td>
<td>3</td>
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<td>WGST 401</td>
<td>Feminist Theory</td>
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<td>WGST 481</td>
<td>Senior Seminar</td>
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<tr>
<td>WGST humanities electives</td>
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<td>6</td>
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Select from the following:

- WGST 302 Women and Religion
- WGST 330 Women in Ancient Greece and Rome
- WGST 333/ Gay and Lesbian Literature
- ENGL 333
- WGST 343/ Sex, Gender and Cinema
- FILM 343
- WGST 374/ Women Writers
- ENGL 374
- WGST 409/ Studies in Gender and Philosophy
- PHIL 409
- WGST 411/ Representations of Motherhood
- COMM 411

1 Step 1 Doctoral Program with Texas A&M International University-Corpus Christi and Texas A&M University-Kingsville.
<table>
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<tr>
<th>Course Code</th>
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<tr>
<td>WGST 422/</td>
<td>Studies in Gender and French</td>
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<td>FREN 422</td>
<td>Literature</td>
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<tr>
<td>WGST 445</td>
<td>Queer Theory</td>
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<tr>
<td>WGST 452/</td>
<td>Women and Gender in Italian</td>
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<td>ITAL 452</td>
<td>Literature</td>
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<td>WGST 461/</td>
<td>History of American Women</td>
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<td>HIST 461</td>
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<td>WGST 473/</td>
<td>History of Modern American</td>
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<td>HIST 473</td>
<td>Women</td>
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<td>WGST 474/</td>
<td>Studies in Women Writers</td>
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<td>ENGL 474</td>
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<td>WGST 476/</td>
<td>Sex and Sexuality in History</td>
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<td>HIST 476</td>
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<td>WGST 477/</td>
<td>Women and Gender in Modern</td>
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<td>HIST 477</td>
<td>European History</td>
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<td>Select from the following:</td>
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<td>WGST 207/</td>
<td>Introduction to Gender and Society</td>
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<td>SOCI 207</td>
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<td>WGST 300/</td>
<td>Psychology of Women</td>
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<td>PSYC 300</td>
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<td>WGST</td>
<td>Psychology of Women of Color</td>
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<td>303/AFST</td>
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<td>WGST 310/</td>
<td>Motherhood in Society</td>
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<td>SOCI 310</td>
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<td>WGST 315/</td>
<td>The Marriage Institution</td>
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<td>SOCI 315</td>
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<td>WGST 316/</td>
<td>Sociology of Gender</td>
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<td>SOCI 316</td>
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<td>WGST 317/</td>
<td>Women in Politics</td>
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<td>POLS 317</td>
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<td>WGST 318/</td>
<td>The Economics of Gender and Race</td>
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<td>ECON 318</td>
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<td>WGST 332/</td>
<td>Alternative Genders</td>
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<td>SOCI 332</td>
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<td>WGST 334/</td>
<td>Women's Health</td>
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<td>HLTH 334</td>
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<td>WGST 357/</td>
<td>Women in Government in</td>
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<td>POLS 367</td>
<td>Comparative Perspective</td>
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<td>WGST 403</td>
<td>Language and Gender</td>
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<td>WGST 404/</td>
<td>Women and Culture</td>
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<td>ANTH 404</td>
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<td>WGST 407/</td>
<td>Women, Minorities and the Mass</td>
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<td>COMM 407</td>
<td>Media</td>
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<td>WGST 420/</td>
<td>Gender and Communication</td>
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<td>COMM 420</td>
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<td>WGST 424/</td>
<td>Women and Work in Society</td>
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<td>SOCI 424</td>
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<td>WGST 430/</td>
<td>Employment Discrimination Law</td>
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<td>MGMT 430</td>
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<td>WGST 439/</td>
<td>Gender, Ethnicity and Class in</td>
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<td>ANTH 439</td>
<td>Archaeological Research</td>
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<tr>
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<td>Women and the Law</td>
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<td>POLS 462</td>
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<td>Gender in Asia</td>
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<td>Special Topics in...</td>
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<td>Research</td>
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<td>Psychology of Women of Color</td>
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<td>Studies in Gender and Diversity</td>
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<td>WGST 489</td>
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**College and University Requirements**

**Communication**

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<td>ENGL 203</td>
<td>Writing about Literature</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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</table>

**Literature in English** (p. 465) | 6 |

**Foreign language** (p. 465) | 14 |

**Mathematics** (p. 22) | 6 |

**Life and physical sciences** (p. 22) | 9 |

**Creative arts** (p. 24) | 3 |

**Language, philosophy and culture** (p. 23) | 3 |

**Language, philosophy and culture course or Creative arts course (p. 23)** | 3 |

**Social and behavioral sciences** (p. 25) | 3 |

**Government/political science** (p. 25) | 6 |

**American history** (p. 25) | 6 |

**International and cultural diversity** (p. 40) | 8 |

**Electives** | 7-10 |

**Total Semester Credit Hours** | 120 |

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1. Courses may be applied both toward the WGST international and cultural diversity requirement and toward the WGST humanities and/or social sciences requirements.

2. Only students who are double majoring do not need to complete a minor. See the Minor Requirements section below.

3. A minimum grade of C is required.

4. See **Literature in English** table below for college approved list of courses.

5. WGST course may not be used to fulfill this requirement.
Completion of four semesters of upper-level ROTC may be substituted for 3 hours of American history or political science.

No more than one course may be in Texas history.

Students are required to complete 6 hours of International and Cultural Diversity courses. These courses may also be used to satisfy other requirements.

Minimum of 7 hours if 18-hour minor; minimum of 10 hours if 15-hour minor.

27 hours of WGST coursework required for the BA degree.

A minimum 2.0 GPR and a minimum grade of C for a course to count in the major. Completion of a minor in another field and completion of distribution requirements in the major as outlined.

At least 12 semester hours in the major must be completed in advanced courses (300- and 400-level), and at least 12 semester hours in the major field must be completed in residence at Texas A&M.

**Minor Requirements**

All Women's and Gender Studies majors, with the exception of those who are double-majoring, must complete a minor chosen from other departments or divisions within or outside the College of Liberal Arts. The minor will consist of 15–18 hours of coursework with a minimum of 6 hours in residence at the 300- to 400-level. A grade of C or higher is required if a course is to count in the minor. Courses taken toward the minor may also be used to satisfy University Core Curriculum requirements. Students should consult the advisor for the minor or the Undergraduate Student Services Office in the College of Liberal Arts for details about how to satisfy minor requirements.

**College and University Requirements**

Other courses may qualify. Students should consult the approved lists of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. Students must complete a minimum of 36 hours of 300- or 400-level course work at Texas A&M University.

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<th>Semester Credit Hours</th>
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<td>ENGL 212</td>
<td>Shakespeare</td>
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<td>ENGL 219</td>
<td>Literature and the Other Arts</td>
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<td>Survey of English Literature II</td>
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<td>Nineteenth-Century Literature (Victorian)</td>
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<td>The Bible as Literature</td>
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<td>ENGL 373</td>
<td>American Realism and Naturalism</td>
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Africana Studies - Minor

The College of Liberal Arts offers a minor in Africana Studies.

An interdisciplinary minor that can be paired easily with any major, Africana Studies is a program which provides students with a unique opportunity to think critically about the cultural, historical and social contributions and experiences of people from Africa and of African descent. In our program, students examine the construction of blackness across ethnic, regional, and national boundaries. Africana Studies courses are a comingling of traditional approaches to the field and cutting edge scholarship that challenges stereotypical portrayals of blacks the world over.

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<td>AFST 362/</td>
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<tr>
<td>HIST 302</td>
<td>Women and War in the African Diaspora</td>
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Comparative Cultural Studies International - Minor

The College of Liberal Arts offers a minor in Comparative Cultural Studies (International).

**Program Requirements**

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<td>Geography of the Global Village</td>
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<tr>
<td>or GEOG 311</td>
<td>Cultural Geography</td>
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<td>Economic Development of Europe</td>
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<td>Modern and Contemporary Drama</td>
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<td>ENGL 350</td>
<td>Twentieth-Century Literature to World War II</td>
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<tr>
<td>ENGL 374/</td>
<td>Women Writers</td>
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<td>GEOG 323</td>
<td>Geography of Latin America</td>
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<td>Latin America Since 1810</td>
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<tr>
<td>PHIL 283</td>
<td>Latin American Philosophy</td>
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<tr>
<td>PHIL 416</td>
<td>Recent British and American Philosophy</td>
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<tr>
<td>PHIL 419</td>
<td>Current Continental Philosophy</td>
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<tr>
<td>POLS 322</td>
<td>Western European Government and Politics</td>
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<tr>
<td>POLS 323</td>
<td>Political Systems of Latin America</td>
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<tr>
<td>POLS 324</td>
<td>Politics of Global Inequality</td>
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</tbody>
</table>

Students must make a grade of C or better.
POLS 338  Government and Politics of the Former Soviet Union
POLS 365/ASIA 365  Asian Governments and Politics
SOCI 325/ASIA 325  International Business Behavior
SOCI 329/ASIA 329  Pacific Rim Business Behavior
SPAN 320  Introduction to Hispanic Literature
SPAN 332  Spanish Literature from 1700 to 1936
SPAN 342  Spanish-American Literature from 1821 to 1935
SPAN 410  Hispanic Film
SPAN 411  Contemporary Hispanic Society and Culture
SPAN 421  Spanish Language Poetry
SPAN 450  Contemporary Spanish and Spanish-American Literature

Select one of the following in consultation with program coordinator:
ANTH 300  Cultural Change and Development
ANTH 314  Agrarian Peasant Societies
ANTH 403/RELS 403  Anthropology of Religion
ANTH 404/AFST 404  Women and Culture
WGST 404
ANTH 426  Anthropology of Food and Nutrition
COMM 335  Intercultural Communication
ECON 324  Comparative Economic Systems
ECON 330  Economic Development
ECON 418  Economics of Labor
ENGL 251/FILM 251  Introduction to Film Analysis
ENGL 338  American Ethnic Literature
HIST 319  U.S. Immigration and Ethnicity
SOCI 317/AFST 317  Racial and Ethnic Relations

Select three of the following not already taken:
ENGL 338  American Ethnic Literature
HIST 319  U.S. Immigration and Ethnicity
SOCI 317/AFST 317  Racial and Ethnic Relations
ANTH 301  Indians of North America
COMM 327  American Oratory
COMM 407/WGST 407  Women, Minorities and the Mass Media
COMM 425/AFST 425  Rhetoric of the Civil Rights Movement
ENGL 336  Life and Literature of the Southwest
ENGL 337  Life and Literature of the American South
ENGL 339/AFST 339  African-American Literature
AFST 339  Post-1930
ENGL 340  Modern and Contemporary Drama
ENGL 350  Twentieth-Century Literature to World War II
ENGL 362/HISP 362  Latino/a Literature
ENGL 474/WGST 474  Studies in Women Writers
GEOG 301  Geography of the United States
HIST 301/AFST 301  Blacks in the United States Since 1877
HIST 305  Mexican-American History 1848-Present
HIST 307  Latino Communities of the U.S.
HIST 451  Southern Identities and Cultures Since Reconstruction
HIST 459  American Society and Culture to 1877
MUSC 200  Topics in Music
POLS 318  Theories of International Relations
SOCI 316/AFST 316  Sociology of Gender
SOCI 323/AFST 323  Sociology of African Americans
SOCI 403  Sociology of Latinos
SPAN 412  U.S. Hispanic Writers

Capstone course (selected in consultation with program coordinator)

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

Comparative Cultural Studies U.S. - Minor

The College of Liberal Arts offers a minor in Comparative Cultural Studies (U.S.).
Film Studies - Minor

The Interdisciplinary Minor in Film Studies prepares undergraduate students to think and write critically about film and media from multiple perspectives. The minor offers courses in the history, criticism, and theory of film and media, and provides opportunities to pursue analyses of the aesthetic, cultural, economic, technological, and international dimensions of film. The foundational courses, FILM 251/ENGL 251 and FILM 299, set the stage for advanced courses in Film. A major goal of the program is to connect the student’s major field of study with an understanding of film’s cultural and social significance. Drawing from the expertise of affiliated faculty across the College of Liberal Arts, the minor can be tailored to the student’s interests. The minor culminates in a Senior Seminar involving research on a special topic in the study of film.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>FILM 251/ENGL 251</td>
<td>Introduction to Film Analysis</td>
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<tr>
<td>FILM 299</td>
<td>History of Film</td>
<td>3</td>
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<td>FILM 481</td>
<td>Seminar in Film Studies</td>
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<td>FILM 289</td>
<td>Special Topics in...</td>
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<td>Sex, Gender and Cinema</td>
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<td>FILM 345/ COMM 345</td>
<td>Media Industries</td>
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<td>FILM 349</td>
<td>Documentary Cinema</td>
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<td>FILM 351/ ENGL 351</td>
<td>Advanced Film</td>
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<td>FILM 356/ ENGL 356</td>
<td>Literature and Film</td>
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<td>FILM 376/ PHIL 376</td>
<td>Philosophy, Film and Evil</td>
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<td>FILM 394</td>
<td>Studies in Film Genre</td>
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<tr>
<td>FILM 398/ AFST 398</td>
<td>Africana Cinema</td>
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<td>FILM 401</td>
<td>National Cinema History</td>
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<td>FILM 402</td>
<td>Intermedia Performance</td>
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<td>FILM 405/ EURO 405</td>
<td>European Cinema</td>
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<td>FILM 406/ EURO 406</td>
<td>Propaganda and Dissidence</td>
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<td>FILM 415/ CLAS 415</td>
<td>The Ancient World in Film</td>
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<td>FILM 425/ FREN 425</td>
<td>French Film</td>
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<td>FILM 435/ GERM 435</td>
<td>German Film</td>
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<tr>
<td>FILM 445/ COMM 435</td>
<td>Rhetoric of Television and Film</td>
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<tr>
<td>FILM 455/ ITAL 455</td>
<td>Italian Cinema</td>
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Select three of the following: 9

- Portfolio
- ARCH 250 Survey of World Architecture
- History II
- or ANTH 21 Social and Cultural Anthropology
- or GEOG 20 Geography of the Global Village

Select twelve hours from the following: 12

- ARTS 350 The Arts and Civilization
- CARC 311 Field Studies in Design Communication
- CARC 331 Field Studies in Design Philosophy
- HIST 362 History of Science

Other courses approved by student’s college

Total Semester Credit Hours 16

1. Portfolio in global culture and society may be completed either during the long semester abroad or upon return to College Station.
2. Must be taken in a single fall or spring semester at a TAMU-affiliated facility such as Santa Chiara or Soltis Center.

Students must make a grade of "C" or better in all courses.

Global Culture and Society - Minor

The College of Liberal Arts offers a minor in Global Culture and Society.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
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<tr>
<td>Portfolio 1</td>
<td>Survey of World Architecture</td>
<td>1</td>
</tr>
<tr>
<td>ARCH 250</td>
<td>History II</td>
<td>3</td>
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<tr>
<td>or ANTH 21</td>
<td>Social and Cultural Anthropology</td>
<td></td>
</tr>
<tr>
<td>or GEOG 20</td>
<td>Geography of the Global Village</td>
<td></td>
</tr>
</tbody>
</table>

Select twelve hours from the following: 12

- ARTS 350 The Arts and Civilization
- CARC 311 Field Studies in Design Communication
- CARC 331 Field Studies in Design Philosophy
- HIST 362 History of Science

Other courses approved by student’s college

Total Semester Credit Hours 16

1. Portfolio in global culture and society may be completed either during the long semester abroad or upon return to College Station.
2. Must be taken in a single fall or spring semester at a TAMU-affiliated facility such as Santa Chiara or Soltis Center.

Students must make a grade of "C" or better in all courses.

Journalism - Minor

Journalism Studies in The College of Liberal Arts offers a minor in Journalism, as well as a major in Journalism, and provides a background in reporting, from interviewing to on-line records searches, and in writing, from deadline news stories to longer analytical and feature pieces. Video production for the web is an integral part of news writing in our program, along with the opportunity for specialized, advanced writing classes in political reporting, literary nonfiction, arts and entertainment journalism, and magazine writing. Students also can get in-depth experience in the field of new media, particularly blogging.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOUR 200</td>
<td>Mass Media Information</td>
<td>3</td>
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<tr>
<td>JOUR 203</td>
<td>Media Writing I</td>
<td>3</td>
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<tr>
<td>JOUR 490</td>
<td>Journalism as a Profession</td>
<td>3</td>
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</tbody>
</table>
JOUR 484 Internship 3

Select one of the following: 3
COMM 307/Mass Communication, Law, and Society
JOUR 301 Law and Society
JOUR 303 Media Writing II
JOUR 304 Editing for the Mass Media

Select one of the following: 3
ANTH 225 Introduction to Biological Anthropology
ANTH 301 Indians of North America
ANTH 316 Nautical Archaeology
ANTH 317/Introduction to Biblical Archaeology
RELS 317
ANTH 404/ Women and Culture
WGST 404
ARTS 489 Special Topics in...
COMM 350 Theories of Mediated Communication
COMM 354 Political Economy of Telecommunication
COMM 458/Global Media
JOUR 458
COMM 480/Religious Communication
RELS 480
ECON 312 Poverty, Inequality and Social Policy
ENGL 210 Technical and Business Writing
HIST 343 Inter-American Relations
HIST 460 American Society and Culture Since 1877
HIST 470 American Business History
MUSC 201 Music and the Human Experience
MUSC 324/Music in World Cultures
ANTH 324
POLS 302 The Mass Media and Politics
POLS 359 American Political Thought
PSYC 315 Social Psychology
SOCI 314 Social Problems
SOCI 327 Morality and Society
SOCI 423 Globalization and Social Change
VIST 485 - VIST 489 (p. 982)

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

Leadership - Minor

The College of Liberal Arts offers a minor in Leadership.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>COMM 324</td>
<td>Communication Leadership and Conflict Management</td>
<td>3</td>
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<tr>
<td>PHIL 381</td>
<td>Ethical Theory</td>
<td>3</td>
</tr>
<tr>
<td>POLS 328</td>
<td>Globalization and Democracy</td>
<td>3</td>
</tr>
<tr>
<td>or SOCI 206</td>
<td>Global Social Trends</td>
<td>3</td>
</tr>
<tr>
<td>HIST 426/CLAS 426</td>
<td>The Ancient Greeks</td>
<td>3</td>
</tr>
<tr>
<td>or HIST 463</td>
<td>or American Foreign Relations Since 1913</td>
<td>3</td>
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</tbody>
</table>
| Select one of the following: 3
COMM 335 Intercultural Communication
HIST 343 Inter-American Relations
LBAR 181 First-Year Seminar in the Liberal Arts
PHIL 332 Social and Political Philosophy
POLS 369 Theories of Democracy
SOCI 312 Population and Society
SOCI 404/ Sociology of the Community
RPTS 404

Total Semester Credit Hours 15

Students must make a grade of "C" or better in all courses.

Liberal Arts Honors - Minor

This minor will allow talented students the opportunity to craft a coherent and challenging program by utilizing at least four distinct Liberal Arts disciplines, as well as requiring significant investment in upper-level liberal arts coursework to include research or independent study as a capstone experience.

The minor is designed to ensure that students, in consultation with their honors advisor, will be able to create a minor that will expose them to an intelligent and well-conceived liberal arts experience, giving students a breadth and depth of experience in the liberal arts.

For the vast majority of minors the upper-level requirement is normally 9 hours. This minor requires students to complete 12 hours at the upper level from different departments. That would presuppose a superior acquisition of knowledge already acquired in different disciplines, particularly as many of our 300- and 400-level courses have required prerequisites. The capstone experience of research or independent study ensures that students will be able not only to acquire a better understanding of a cross-disciplinary liberal arts approach, but to apply it in practice as well as theory.

Program Requirements

Minimum of 18 hours of Honors Liberal Arts courses.

At least 12 hours must be at the 300- and 400-level approved by a College Honors advisor.

3 hours of a departmental capstone 485, 491, or 497 CLLA course. Must be approved by a College Honors advisor.
Courses must come from a minimum of four separate CLLA departments.

Must maintain a 3.50 or higher GPA.

## Religious Studies - Minor

The College of Liberal Arts offers an 18-credit Interdisciplinary Minor in Religious Studies. Students must have a GPA above 2.0 and fewer than 90 hours of completed coursework to declare the minor. Courses in the Religious Studies minor approach religion from a variety of disciplines. Students can explore the history of religious traditions, religion in contemporary life, religion in literature, and many other topics. Students gain perspective on the complexity of religious thought in world cultures.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Comparative Religions</td>
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<tr>
<td>RELS 303/</td>
<td>Near Eastern Religions</td>
<td>3</td>
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<tr>
<td>HUMA 303</td>
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<tr>
<td>RELS 304/</td>
<td>Indian and Oriental Religions</td>
<td>3</td>
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<td>HUMA 304</td>
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<tr>
<td>ANTH 317/</td>
<td>Introduction to Biblical Archaeology</td>
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<tr>
<td>RELS 317</td>
<td></td>
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<tr>
<td>ANTH 340/</td>
<td>Folklore and the Supernatural</td>
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<tr>
<td>RELS 340</td>
<td></td>
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<tr>
<td>ANTH 403/</td>
<td>Anthropology of Religion</td>
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<tr>
<td>RELS 403</td>
<td></td>
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<tr>
<td>COMM 480/</td>
<td>Religious Communication</td>
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<tr>
<td>RELS 480</td>
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<tr>
<td>ENGL 365/</td>
<td>The Bible as Literature</td>
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<tr>
<td>RELS 360</td>
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<tr>
<td>ENGL 392/</td>
<td>Studies in Literature, Religion and Culture</td>
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<tr>
<td>RELS 392</td>
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<tr>
<td>GERM 434</td>
<td>Martin Luther and the Reformation in Germany</td>
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<td>HIST 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<tr>
<td>HIST 221/</td>
<td>History of Islam</td>
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<tr>
<td>RELS 221</td>
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<td>HIST 347/</td>
<td>Rise of Islam, 600-1258</td>
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<td>RELS 347</td>
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<td>HIST 365/</td>
<td>Religion in Early America</td>
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<td>RELS 365</td>
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<td>HIST 366/</td>
<td>Religion in Modern America</td>
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<td>RELS 366</td>
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<td>European Intellectual History from Ancient Greece to the Early Middle Ages</td>
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<tr>
<td>RELS 419</td>
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<tr>
<td>HIST 419/</td>
<td>European Intellectual History from the High Middle Ages to the 17th Century</td>
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<tr>
<td>RELS 419</td>
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<tr>
<td>HUMA 211/</td>
<td>Hebrew Scriptures</td>
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<td>RELS 211</td>
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<td>HUMA 213/</td>
<td>New Testament</td>
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<td>RELS 213</td>
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<td>RELS 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<td>HIST 221</td>
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<td>Classical Mythology</td>
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<td>Women and Religion</td>
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<td>RELS 312</td>
<td>Contemplation in the Modern World</td>
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<td>Introduction to Biblical Archaeology</td>
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<td>ANTH 317</td>
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<td>RELS 321</td>
<td>Political Islam and Jihad</td>
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<td>PHIL 331</td>
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<td>History of Religion in America to 1860</td>
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<td>HIST 365</td>
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<td>RELS 366/</td>
<td>History of Religion in America from 1860 to the Present</td>
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<td>HIST 366</td>
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<tr>
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<td>RELS 403/</td>
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<td>RELS 405</td>
<td>Psychology of Religion</td>
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<td>RELS 418</td>
<td>European Intellectual History from Ancient Greece to the Early Middle Ages</td>
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<tr>
<td>RELS 419</td>
<td>European Intellectual History from the High Middle Ages to the 17th Century</td>
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<td>RELS 436/</td>
<td>Ancient Egypt</td>
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<td>Modern Jewish Thought and Philosophy</td>
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<td>RELS 471/</td>
<td>Hispanic Religions</td>
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<td>HISP 471</td>
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<td>RELS 485</td>
<td>Directed Studies</td>
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<td>RELS 489</td>
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<td>RELS 474/</td>
<td>Diversity Lessons from Medieval</td>
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<td>HISP 474</td>
<td>Spain</td>
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<td>RELS 480/</td>
<td>Religious Communication</td>
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<td>COMM 480</td>
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<tr>
<td>RELS 491</td>
<td>Research</td>
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</tbody>
</table>

¹ Select two or four of the following courses as elective requirements.
Women's and Gender Studies - Minor

Women's and Gender Studies is a flexible interdisciplinary program devoted to the critical analysis of gender and the pursuit of knowledge about women throughout history and around the world. Combining the methods and insights of traditional liberal arts disciplines with the special insights of scholarship on women's and gender studies, our courses yield fresh perspectives on the nature of gender as it intersects with race, ethnicity, class, religion, and nation, and encourage students to look beyond their own culture and era in examining gender's role in shaping society. Through interdisciplinary breadth and an emphasis on critical thinking, women's and gender studies prepares students to employ critical learning in their private lives as well as in public roles as citizens and members of a diverse and complex workforce.

Minors in women's and gender studies receive training in both humanities and social sciences approaches and are required to complete coursework that focuses on material beyond dominant U.S. culture; core courses have both theoretical and applied focuses.

Since gender has far-reaching influence on daily life, world culture, and public policy, this minor supports students in a wide range of fields. As a liberal arts degree, women's and gender studies is attractive to employers looking for recruits trained in critical thinking, organizational skills, reading, writing, and presenting in a wide range of subject areas. Expertise in women's and gender issues is increasingly important to businesses, governmental agencies, and other organizations dealing with matters such as sexual harassment, flex-time, parental leave, and pay equity, just as specialists in women's and gender studies find opportunities in education, law, health care, social work, counseling, media, public policy, and a wide range of other fields.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>WGST 200</td>
<td>Introduction to Women's and Gender Studies</td>
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<td>WGST 481</td>
<td>Senior Seminar</td>
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<tr>
<td>Select four of the following:</td>
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<tr>
<td>WGST 207/</td>
<td>Introduction to Gender and Society</td>
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<td>SOCI 207</td>
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<td>Women and Religion</td>
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<td>WGST 303</td>
<td>Psychology of Women of Color</td>
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<tr>
<td>WGST 307</td>
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<td>WGST 310/</td>
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<td>SOCI 310</td>
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<td>WGST 315</td>
<td>The Marriage Institution</td>
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<td>SOCI 315</td>
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<td>WGST 316/</td>
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<td>SOCI 316</td>
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<td>Women in Politics</td>
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<td>POLS 317</td>
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<td>WGST 318/</td>
<td>The Economics of Gender and Race</td>
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<td>ECON 318</td>
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<td>WGST 330</td>
<td>Women in Ancient Greece and Rome</td>
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<td>WGST 332/</td>
<td>Alternative Genders</td>
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<td>WGST 333/</td>
<td>Gay and Lesbian Literature</td>
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<td>WGST 334/</td>
<td>Women's Health</td>
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<tr>
<td>WGST 343/</td>
<td>Sex, Gender and Cinema</td>
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<td>WGST 367/</td>
<td>Women in Government in</td>
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<td>POLS 367</td>
<td>Comparative Perspective</td>
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<td>WGST 374/</td>
<td>Women Writers</td>
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<td>ENGL 374</td>
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<td>WGST 391</td>
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<td>WGST 401</td>
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<td>WGST 403</td>
<td>Language and Gender</td>
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<td>WGST 404/</td>
<td>Women and Culture</td>
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<td>ANTH 404</td>
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<td>WGST 407/</td>
<td>Women, Minorities and the Mass</td>
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<td>Media</td>
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<td>WGST 409/</td>
<td>Studies in Gender and Philosophy</td>
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<td>PHIL 409</td>
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<td>WGST 411/</td>
<td>Representations of Motherhood</td>
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<td>COMM 411</td>
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</tbody>
</table>

Students must make a grade of "C" or better in all courses.

At least 9 semester credit hours must be 300-400 level courses.
Diversity - Certificate

WGST 420/ Gender and Communication
COMM 420
WGST 422/ Studies in Gender and French
FREN 422 Literature
WGST 424/ Women and Work in Society
SOCI 424
WGST 428/ Women’s Rhetoric
COMM 428
WGST 430/ Employment Discrimination Law
MGMT 430
WGST 439/ Gender, Ethnicity and Class in
ANTH 439 Archaeological Research
WGST 445 Queer Theory
WGST 452/ Women and Gender in Italian
ITAL 452 Literature
WGST 461/ History of American Women
HIST 461
WGST 462/ Women and the Law
POL 452
WGST 463 Gender in Asia
WGST 473/ History of Modern American
HIST 473 Women
WGST 474/ Studies in Women Writers
ENGL 474
WGST 476/ Sex and Sexuality in History
HIST 476
WGST 477/ Women and Gender in Modern
HIST 477 European History
WGST 484 Internship in Women’s and Gender
Studies
WGST 485 Directed Studies
WGST 489 Special Topics in...
WGST 491 Research

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all courses.

Diversity - Certificate

The Diversity Certificate Program enables students to create, synthesize and integrate academic coursework, co-curricular experience, and service learning engagement to demonstrate their preparedness for participation in the modern global economy and community.

Program Requirements

Students must complete a minimum of twelve hours to include nine hours of diversity related courses from the College of Liberal Arts plus an additional three hours chosen in consultation with the certificate advisers. The additional three hours could consist of a research project, internship, directed study or other option, including a regular approved course. Students will be provided with a sample list of courses and advice about the most appropriate choices for their long term goals. Certificate advisers may approve additional courses not on the sample list to count toward the completion of this requirement. The core courses required for this certificate may also count toward other degree requirements. Students should maintain a GPA of 3.0 in certificate courses.

Certificate Components

1. Orientation Session
2. Academic Component - 12 hours, nine hours from the College of Liberal Arts
3. Co-curricular Component - minimum of 10 hours participation in diversity related co-curricular lectures, presentations and activities.
4. Service Learning Component - consists of 20 hours of involvement in an approved project
5. Capstone Retreat

Department of Anthropology

Anthropology is the study of humankind over the entire world and throughout time. With such a broad approach, anthropologists study existing cultures and human behavior (cultural anthropology), traditions (folklore), prehistoric cultures and lifeways (archaeology), the biological makeup and evolution of humans and non-human primates (biological anthropology), and the origin and nature of language (linguistic anthropology). The study of anthropology promotes an understanding of humankind and provides an introduction to the variety inherent in our biological and cultural heritage. Through the comparative study of the many diverse prehistoric and modern cultures of the world, we have a means of reaching a clearer understanding of ourselves and other people.

Faculty

Alvord, Michael S, Associate Professor
Anthropology
PHD, University of New Mexico, 1993

Athreya, Sheela, Associate Professor
Anthropology
PHD, Washington University in St. Louis, 2003

Bryant, Vaughn M, Professor
Anthropology
PHD, The University of Texas at Austin, 1969

Carlson, David L, Professor
Anthropology
PHD, Northwestern University, 1979

Carlson, Deborah N, Associate Professor
Anthropology
PHD, The University of Texas at Austin, 2004

Castor, Nicole M, Assistant Professor
Anthropology
PHD, University of Chicago, 2009

Crisman, Kevin J, Professor
Anthropology
PHD, University of Pennsylvania, 1989

De Ruiter, Darryl J, Professor
Anthropology
PHD, University of the Witwatersrand, South Africa, 2001

Goebel, Frank E, Professor
Anthropology
PHD, University of Alaska Fairbanks, 1993
Wright, Lori E, Professor
Anthropology
PHD, University of Chicago, 1994

Majors

- Bachelor of Arts in Anthropology (p. 486)
- Bachelor of Arts in Anthropology, Archaeology Track (p. 485)

Minors

- Anthropology Minor (p. 487)
- Museum Studies Minor (p. 487)

Anthropology - BA, Archaeology Track

Students who elect to pursue the archaeology track take the foundation courses but also have the opportunity to take multiple upper-level courses which focus on specific topics in archaeology. In addition, majors receive a broad yet rigorous liberal arts education.

The curriculum leading to a degree in anthropology provides students with the background necessary to pursue graduate studies in anthropology, but is well-rounded and flexible enough to allow students to pursue graduate studies in other disciplines. Employment opportunities include careers in: teaching and research in college, university, museum and foundation settings; administration and research in local, state and federal governments (such as the National Park Service, Bureau of Indian Affairs, National Institute of Health and others); non-governmental organizations and non-profit organizations; foreign service with government agencies (such as the Agency for International Development, United Nations organizations and others); private archaeological research institutions; secondary schools that are adding anthropology to their curricula; and nontraditional opportunities emerging in business and management. Anthropology offers diverse career opportunities and is an expanding and dynamic field that is relevant to many fields of study.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>ANTH</td>
<td><strong>Anthropology Archaeology Track Requirements</strong> 1</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Introduction to Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>210</td>
<td>Social and Cultural Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>225</td>
<td>Introduction to Biological Anthropology</td>
<td>4</td>
</tr>
<tr>
<td>226</td>
<td>and Introduction to Biological Anthropology Laboratory</td>
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<tr>
<td>316</td>
<td>Nautical Archaeology</td>
<td>3</td>
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<tr>
<td>412</td>
<td>Archaeological Theory</td>
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<tr>
<td>330</td>
<td>Field Research in Anthropology</td>
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</tr>
<tr>
<td>or ANTH 485 or Directed Studies or ANTH 491 or Research</td>
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<td></td>
</tr>
<tr>
<td>Archaeology elective (300 or 400 level) (p. 721)</td>
<td>9</td>
<td></td>
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<tr>
<td>Anthropology elective (300 or 400 level) can include archaeology (p. 721)</td>
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Department Requirement

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>STAT</td>
<td>Statistical Methods</td>
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</table>

1 This track is designed for students who wish to focus their studies in archaeology.
or STAT 303 or Statistical Methods

**College and University Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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**Literature in English (p. 465)**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>COMM 205</td>
<td>Oral and Written Communication</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
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**Select one of the following:**

<table>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<tr>
<td>COMM 203</td>
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</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
</tbody>
</table>

**Writing Courses**

All students in each track are required to take two courses with the writing attribute, also known as “W-courses”, from the department. Substitutions with W-courses from other departments are not allowed. Please see the academic advisor for the most current list of Anthropology W-courses.

**Minor Requirements**

Anthropology majors may select a minor field of study from departments or divisions within or outside the College of Liberal Arts or in a particular area of interest (as with interdisciplinary minors or career opportunity minors). The minor will consist of 15-18 hours of coursework, at least 6 of which must be at the upper-division level. A grade of C or higher is required if a course is to count in the minor. A minor should be declared before the student has completed 90 credit hours.

**College and University Requirements**

Other courses may qualify for this category. Students should consult the approved lists of courses available through the academic advisor in the Department of Anthropology or in the Undergraduate Student Services Office in the College of Liberal Arts. The following list incorporates University Core Curriculum requirements. No course can be counted in more than one category. To promote the opportunity for anthropology majors to acquire a broad educational experience, anthropology students must satisfy their University requirements for language, philosophy and culture, social and behavioral sciences, and the sciences with courses other than those offered by anthropology.

Students must complete a minimum of 36 hours of 300- or 400-level coursework at Texas A&M University.

**Anthropology - BA**

Anthropology majors pursuing the general anthropology track receive foundations in the archaeology, biological anthropology and cultural anthropology subfields of anthropology as well as options to pursue upper-level courses in each of the subfields.

The curriculum leading to a degree in anthropology provides students with the background necessary to pursue graduate studies in anthropology, but is well-rounded and flexible enough to allow students to pursue graduate studies in other disciplines. Employment opportunities include careers in: teaching and research in college, university, museum and foundation settings; administration and research in local, state and federal governments; non-governmental organizations and non-profit organizations; foreign service with government agencies; non-governmental organizations and non-profit organizations; private archaeological research institutions; secondary schools that are adding anthropology to their curricula; and nontraditional opportunities emerging in business and management. Anthropology offers diverse career opportunities and is an expanding and dynamic field that is relevant to many fields of study.

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<td>ANTH 202</td>
<td>Introduction to Archaeology</td>
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<td>ANTH 210</td>
<td>Social and Cultural Anthropology</td>
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<td>ANTH 225</td>
<td>Introduction to Biological Anthropology &amp; ANTH 226</td>
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<tr>
<td>ANTH 410</td>
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<tr>
<td>Biological anthropology course (p. 721)</td>
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<tr>
<td>Cultural anthropology course (p. 721)</td>
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**Department Requirement**

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<th>Semester Credit Hours</th>
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<tr>
<td>STAT 302</td>
<td>Statistical Methods or STAT 303 or Statistical Methods</td>
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**College and University Requirements**

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</tr>
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</table>
Anthropology - Minor

The minor in anthropology is offered by the Department of Anthropology. The minor consists of 15 hours of coursework in anthropology, 6 of which must be at the 300-400 level and taken in residence.

Program Requirements

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<tr>
<th>Code</th>
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<tr>
<td>ANTH 421</td>
<td>Museums and Their Functions</td>
<td>3</td>
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<tr>
<td>ANTH 484</td>
<td>Anthropology Internship</td>
<td>3</td>
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<tr>
<td>Minor Electives</td>
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</tbody>
</table>

Select from the following:
- ANTH 313 Historical Archaeology
- ANTH 402 Archaeological Artifact Conservation
- ANTH 454 Archaeological Photography
- ARCH 246 Foundations of Historic Preservation
- ARTS 330 The Arts of America
- PHIL 330 Philosophy of Art
- RPTS 307 Methods of Environmental Interpretation
- VIST 465 Art, Culture and Time Based Media

Total Semester Credit Hours 15

Minimum of six hours at the 300-400 level.

Students must make a grade of "C" or better in all courses.

Museum Studies - Minor

The minor in Museum Studies is offered in cooperation with the College of Liberal Arts, the College of Architecture, and the College of Agriculture and Life Sciences. The increase of collections, curatorial facilities and museums ensures this minor is a wise choice for any student with an interest in Anthropology or related fields. The minor will provide students with a foundational understanding of museum studies while giving them professional experience working in a museum. Coursework includes a minimum of 15 hours, including one core course (3 hours), one internship course (3 hours), and three elective courses (9 hours).

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- PHIL 330 Philosophy of Art
- RPTS 307 Methods of Environmental Interpretation
- VIST 465 Art, Culture and Time Based Media

Total Semester Credit Hours 15

Minimum of six hours at the 300-400 level.

Students must make a grade of "C" or better in all courses.
Department of Communication

Communication is concerned with one of the most distinctly human characteristics: the use of spoken language to communicate information, maintain social contact, and influence others. Communication is an attractive major because it provides students with a broad liberal arts education, while at the same time focusing on vital communication skills, which are in high demand in the workplace as well as in political, religious and social communities. Communication skills include public speaking, argumentation, technical communication, leading teams and groups to solve problems, interviewing to gather information and to persuade, use and evaluation of communication technology, as well as a thorough array of communication research methods applications.

Degree requirements include the study of rhetorical and communication theories, the study of communication research methods, and the use of those theories and research methods in a variety of communication contexts. Such contexts include health communication, intercultural communication, interpersonal communication, mass media and new communication technologies, organizational communication, political rhetoric, religious communication, and others. Students use their communication skills to become leaders in all areas of business, social and political life.

The career interests of communication majors vary. Some students pursue advanced degrees in communication, law, business, or religion. Others take communication-related positions in strategic communication, public relations, marketing and sales, training and human resources, leadership and management, health fields related to communication, organizations and public policy, communication media, and related areas of business, industry, government, and non-profit organizations. Still others prepare for teaching careers.

Honors Program

The Department of Communication has a well-established Honors plan and strong linkages to the University honors program. Honors courses are available in all areas of Communication. In addition, students may graduate with honors in Communication noted on the transcript. Honor students may also choose individualized instruction through COMM 497, and through honors contracting. Students interested in the Department’s Honors Program should contact the Communication Undergraduate Studies Office.

Undergraduate Courses

The Department of Communication offers courses in many areas of the discipline: Health Communication, Media Studies, Organizational Communication, Rhetoric and Public Affairs, Leadership and Civic Dialogue and Strategic Communication with significant focus in Intercultural and International communication across each area.

Certificates

The Department of Communication offers four certificates. While these certificates are optional, they permit a student to focus studies in one of four areas. The certificates in Communication and Global Media, in Communication Leadership and Conflict Management, and in Health Communication are open to students in the Department of Communication and in any major across the University. The certificate in Strategic Communication is offered to students majoring in Communication or in Telecommunication Media Studies only.

Faculty

Altenhofen, Brian J, Lecturer
Communication
PHD, Texas A&M University, 2016

Andreas, Dorothy C, Lecturer
Communication
PHD, Texas A&M University, 2010

Aschenbeck, Stacy H, Instructional Assistant Professor
Communication
MA, Texas State University, 1999

Barge, James K, Professor
Communication
PHD, University of Kansas, 1985

Blanton, Hart, Professor
Communication
PHD, Princeton University, 1994

Braman, Sandra, Professor
Communication
PHD, University of Minnesota, Twin Cities, 1988

Burkart, Patrick C, Professor
Communication
PHD, The University of Texas at Austin, 2000

Campbell, Heidi A, Associate Professor
Communication
PHD, The University of Edinburgh, 2002

Conrad, Charles R, Professor
Communication
PHD, Kansas University, 1980

Coombs, William T, Professor
Communication
PHD, Purdue University, 1990

Crick, Nathan A, Professor
Communication
PHD, University of Pittsburgh, 2005

Dorsey, Leroy G, Professor
Communication
PHD, Indiana University, 1993

Dubriwny, Tasha N, Associate Professor
Communication
PHD, University of Georgia, 2005

Dunaway, Johanna L, Associate Professor
Communication
PHD, Rice University, 2006

Goidel, Robert K, Professor
Communication
PHD, University of Kentucky, 1993

Havens, Jessica M, Lecturer
Communication
MA, Colgate University, 2012
Majors

- Bachelor of Arts in Communication (p. 489)
- Bachelor of Arts in Telecommunication Media Studies (p. 490)
- Bachelor of Science in Telecommunication Media Studies (p. 492)

Minors

- Communication Minor (p. 493)

Certificates

- Communication and Global Media Certificate (p. 494)
- Communication Leadership and Conflict Management Certificate (p. 494)
- Health Communication Certificate (p. 494)
- Strategic Communication Certificate (p. 495)

Communication - BA

Students who want to transform the world through communication choose Communication as a major. The Bachelor of Arts in Communication teaches how to influence and persuade others through the use of language, visual images and media. We pursue coursework that gives students a background in the processes and theories of communication as well as in the skills that are so valuable in the working world.

Coursework for incoming Freshmen begins with a dedicated first semester experience which introduces them to the breadth of the field of Communication and of Media. We also welcome Transfer students, meeting them where they are and integrating them into the Communication family. All Communication majors take a core of required courses that establish a firm foundation in the field and then select additional coursework that suits their interests and needs. Students who wish to focus their studies further, may choose to earn a certificate in Health Communication, Strategic Communication, Leadership and Conflict Management or Global Media.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 205</td>
<td>or Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>or COMM 243</td>
<td>or Argumentation and Debate</td>
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</tbody>
</table>
Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>COMM 210 Group Communication and Discussion</td>
<td>3</td>
<td></td>
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<tr>
<td>COMM 215 Interviewing: Principles and Practice</td>
<td></td>
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<td>JOUR 215 Practice</td>
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<tr>
<td>COMM 230 Communication Technology Skills</td>
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<td>JOUR 230</td>
<td></td>
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<tr>
<td>COMM 240 Rhetorical Criticism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 250/ New Media and the Independent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JOUR 250 Voice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 301 Rhetoric in Western Thought</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 305 Theories of Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 308 Research Methods in Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 300-level elective (p. 761)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>COMM 401 to 480 elective (p. 761)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>COMM 100 to 499 elective (p. 761)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 203 Writing about Literature</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Included in graduation requirements are the following stipulations:

1. A minimum of 2.0 GPR
2. Minimum grade of C in each course applied to the major
3. Minimum of 12 hours of upper-level COMM coursework at Texas A&M

### Teaching Certification

Students desiring certification to teach communication in secondary schools of Texas may either major in communication (College of Liberal Arts) or in another field, but in either case, they must include the following courses in their degree plans:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203 Public Speaking</td>
<td>3</td>
<td></td>
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<tr>
<td>COMM 210 Group Communication and Discussion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 243 Argumentation and Debate</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 301 Rhetoric in Western Thought</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 305 Theories of Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 315 Interpersonal Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 350 Theories of Mediated Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 330 Technology and Human Communication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or COMM 333 Communication and Popular Culture</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or COMM 416 Rhetoric of Television and Film</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FILM 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THAR 407 Performing Literature.</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 27

Additional education courses are required. More complete information on the requirements for teacher certification may be found in the College of Education and Human Development section under secondary teacher certification.

### Telecommunication Media Studies - BA

Telecommunication Media Studies focuses on media industries, technologies, and communication systems in current, cultural and historical contexts, their audience processes and effects, and social implications of the media.

The Telecommunication Media Studies major provides students with tools for understanding the media and their roles in social life theoretically, historically and critically. The degree allows students to

1 Should be completed by the end of junior year.
2 COMM 101 and COMM 291 are required for incoming freshmen in the First Semester of freshman year.
3 Minimum grade of C required.
4 Course satisfies a writing elective.
5 ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but not both.
choose a broadly based communication and media studies major or a more specialized study of telecommunication and information systems. Students can choose Communication courses that address media industries, law and policy, technology and society, media audiences, processes, and effects, and the theory, history, and criticism of media, culture, and communication.

A degree in Telecommunication Media Studies is useful in a broad variety of careers, including media and telecommunication industries, as well as communication-related positions in business, government, non-profit organizations, and higher education. The curriculum is designed to educate citizens for a productive future in a changing world. Our students may become broadcasters, producers, industry leaders, government regulators, spokespeople, politicians, writers, artists, activists, and informed citizens.

The BA and BS are both available. The BA is a more flexible, liberal arts media-oriented degree.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 230/ JOUR 230</td>
<td>Communication Technology Skills</td>
<td>3</td>
</tr>
<tr>
<td>COMM 308</td>
<td>Research Methods in Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 330</td>
<td>Technology and Human Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 350</td>
<td>Theories of Mediated Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 360</td>
<td>Cultural History of the Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 401 to 480 (p. 761)</td>
<td>Cultural History of the Media</td>
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<td><strong>Telecommunication Electives</strong> 1</td>
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<td>Select four of the following:</td>
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<td>COMM 101 to 499 (p. 761)</td>
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<tr>
<td>CSCE 110</td>
<td>Programming I</td>
<td></td>
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<td>CSCE 206</td>
<td>Structured Programming in C</td>
<td></td>
</tr>
<tr>
<td>ENGL 251/ FILM 251</td>
<td>Introduction to Film Analysis</td>
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<tr>
<td>FILM 251/ ENGL 251</td>
<td>Introduction to Film Analysis</td>
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<tr>
<td>ISTM 250</td>
<td>Business Programming Logic and Design</td>
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</tr>
<tr>
<td>ISTM 310</td>
<td>Network Communications and Infrastructure</td>
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<tr>
<td>ISTM 315</td>
<td>Database Programming</td>
<td></td>
</tr>
<tr>
<td>ISTM 325</td>
<td>Business Object Oriented Programming with Java</td>
<td></td>
</tr>
<tr>
<td>ISTM 425</td>
<td>Complex Business Application Design</td>
<td></td>
</tr>
<tr>
<td>JOUR 102</td>
<td>American Mass Media</td>
<td></td>
</tr>
<tr>
<td>JOUR 301/ COMM 307</td>
<td>Mass Communication, Law and Society</td>
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<tr>
<td>POLS 302</td>
<td>The Mass Media and Politics</td>
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<tr>
<td>POLS 313</td>
<td>Public Opinion</td>
<td></td>
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<tr>
<td><strong>College and University Requirements</strong></td>
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<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
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<tr>
<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
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<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
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<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>PHIL 240</td>
<td>Introduction to Logic (or higher)</td>
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<tr>
<td>Foreign language (p. 465)</td>
<td>14</td>
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<tr>
<td>Literature in English (p. 465) 2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences elective (p. 22)</td>
<td>9</td>
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</tr>
<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Creative arts elective (p. 24) 3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture or creative arts elective (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences elective (p. 25) 3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>American history elective (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>International and cultural diversity (p. 40) 4</td>
<td></td>
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<tr>
<td>Minor 5</td>
<td>15-18</td>
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<tr>
<td>General Electives 6</td>
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</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>120</td>
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</tr>
</tbody>
</table>

1 COMM 203 and COMM 243 cannot be taken as electives. Courses in the Core Requirements not selected to meet those requirements may be selected as electives. At least 6 semester credit hours must be chosen from COMM Writing Intensive courses.

2 ENGL 203 will count toward the Communication requirement or the Literature in English requirement, but not both.

3 COMM course may not be used to fulfill this requirement

4 Courses may also be used to satisfy any other requirement.

5 Sequences approved by the College of Liberal Arts, except Communication. No more than 9 semester credit hours may be at a lower-division (100 and 200) level. A minor must be declared before a student completes 75 semester credit hours. Minimum grade of C is required.
Maximum of 9 semester credit hours of any combination of military science and physical activity courses.

Students take 21 credit hours of the required program core courses and 12 credit hours of telecommunication elective courses for a total of 33 credit hours. At least 12 credits must be at the upper-division level. At least 12 credits must be taken in residence at Texas A&M University. Minimum grade of C in each course. No more than 3 credit hours of COMM 484; no more than 6 credit hours of COMM 485.

Teaching Certification

Students desiring certification to teach communication in secondary schools of Texas may either major in communication (College of Liberal Arts) or in another field, but in either case, they must include the following courses in their degree plans:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 210</td>
<td>Group Communication and Discussion</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>COMM 301</td>
<td>Rhetoric in Western Thought</td>
<td>3</td>
</tr>
<tr>
<td>COMM 305</td>
<td>Theories of Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 315</td>
<td>Interpersonal Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 350</td>
<td>Theories of Mediated Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 330</td>
<td>Technology and Human Communication</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or COMM 3 or Communication and Popular Culture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or COMM 4 or Rhetoric of Television and Film</td>
<td>3</td>
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<td></td>
<td>FILM 445</td>
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<tr>
<td>THAR 407</td>
<td>Performing Literature.</td>
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</tr>
<tr>
<td>Total Semester Credit Hours</td>
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<td>27</td>
</tr>
</tbody>
</table>

Additional education courses are required. More complete information on the requirements for teacher certification may be found in the College of Education and Human Development section under secondary teacher certification.

Telecommunication Media Studies - BS

Telecommunication Media Studies focuses on media industries, technologies, and communication systems in current, cultural and historical contexts, their audience processes and effects, and social implications of the media.

The Telecommunication Media Studies major provides students with tools for understanding the media and their roles in social life theoretically, historically and critically. The degree allows students to choose a broadly based communication and media studies major or a more specialized study of telecommunication and information systems. Students can choose Communication courses that address media industries, law and policy, technology and society, media audiences, processes, and effects, and the theory, history, and criticism of media, culture, and communication.

A degree in Telecommunication Media Studies is useful in a broad variety of careers, including media and telecommunication industries, as well as communication-related positions in business, government, non-profit organizations, and higher education. The curriculum is designed to educate citizens for a productive future in a changing world. Our students may become broadcasters, producers, industry leaders, government regulators, spokespeople, politicians, writers, artists, activists, and informed citizens.

The BA and BS are both available. The BS is more directed and requires a quantitative background.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Core Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>COMM 230/</td>
<td>Communication Technology Skills</td>
<td>3</td>
</tr>
<tr>
<td>JOUR 230</td>
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<tr>
<td>COMM 307/</td>
<td>Mass Communication, Law, and Society</td>
<td>3</td>
</tr>
<tr>
<td>JOUR 301</td>
<td></td>
<td></td>
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<tr>
<td>or COMM 354 or Political Economy of Telecommunication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 330</td>
<td>Technology and Human Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 345/</td>
<td>Media Industries</td>
<td>3</td>
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<tr>
<td>FILM 345</td>
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<tr>
<td>COMM 350</td>
<td>Theories of Mediated Communication</td>
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<tr>
<td>COMM 375</td>
<td>Media Audiences</td>
<td>3</td>
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<td>COMM 400 to 480 (p. 761)</td>
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<td><strong>Telecommunication Electives</strong></td>
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<td>COMM 100 to 499 (p. 761)</td>
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<td>Programming I</td>
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</tr>
<tr>
<td>CSCE 206</td>
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<td>Business Programming Logic and Design</td>
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<td>ISTM 310</td>
<td>Network Communications and Infrastructure</td>
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<td></td>
</tr>
<tr>
<td>ISTM 425</td>
<td>Complex Business Application Design</td>
<td></td>
</tr>
<tr>
<td>JOUR 102</td>
<td>American Mass Media</td>
<td></td>
</tr>
<tr>
<td>JOUR 301/</td>
<td>Mass Communication, Law and Society</td>
<td></td>
</tr>
<tr>
<td>COMM 307</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MGMT 209</td>
<td>Business, Government and Society</td>
<td></td>
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<tr>
<td>MGMT 309</td>
<td>Survey of Management</td>
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<tr>
<td>TCMG 274</td>
<td>Foundations of Networking in Education</td>
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<tr>
<td>WGST 407/</td>
<td>Women, Minorities and the Mass</td>
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<td></td>
<td>Media</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
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College and University Requirements

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>
COMM 308 Research Methods in Communication 3

ISTM 210 Fundamentals of Information Systems 3

Select one of the following: 3

ISTM 250 Business Programming Logic and Design

SOCI 220 Methods of Social Research

STAT 307 Sample Survey Techniques

Select one of the following: 3

MATH 140 Mathematics for Business and Social Sciences

MATH 141 Finite Mathematics

MATH 166 Topics in Contemporary Mathematics II

POLS 206 American National Government 3

POLS 207 State and Local Government 3

STAT 303 Statistical Methods 3

Select one of the following: 3

ENGL 203 Writing about Literature

ENGL 210 Technical and Business Writing

COMM 203 Public Speaking

COMM 205 Communication for Technical Professions

COMM 243 Argumentation and Debate

Select one of the following: 3

MATH 131 Mathematical Concepts—Calculus

MATH 142 Business Calculus

MATH 151 Engineering Mathematics I

PHIL 240 Introduction to Logic (or higher)

American history elective (p. 25) 6

Creative arts elective (p. 24) 3

International and cultural diversity (p. 40) 4

Language, philosophy and culture elective (p. 23) 3

Language, philosophy and culture or creative arts elective (p. 23) 3

Life and physical sciences elective (p. 22) 9

Literature in English (p. 465) 2

Social and behavioral sciences electives (p. 25) 3

Minorm

15-18

General Electives 0-6

Total Semester Credit Hours 120

6 Maximum of 9 semester credit hours of any combination of military science and physical activity courses.

Students take 24 credit hours of the required program core courses and 9-10 credit hours of telecommunication media studies elective courses for a total of 33 credit hours. At least 12 credits must be at the upper-division level. At least 12 credits must be taken in residence at Texas A&M University. Minimum grade of C in each course. No more than 3 credit hours of COMM 484; no more than 6 credit hours of COMM 485.

Teaching Certification

Students desiring certification to teach communication in secondary schools of Texas may either major in communication (College of Liberal Arts) or in another field, but in either case, they must include the following courses in their degree plans:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
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<td>Public Speaking</td>
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<td>Group Communication and Discussion</td>
<td>3</td>
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<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>COMM 301</td>
<td>Rhetoric in Western Thought</td>
<td>3</td>
</tr>
<tr>
<td>COMM 305</td>
<td>Theories of Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 315</td>
<td>Interpersonal Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 350</td>
<td>Theories of Mediated Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 330</td>
<td>Technology and Human Communication</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 3 or Communication and Popular Culture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or COMM 4 or Rhetoric of Television and Film Film 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THAR 407</td>
<td>Performing Literature.</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 27

Additional education courses are required. More complete information on the requirements for teacher certification may be found in the College of Education and Human Development section under secondary teacher certification.

Communication - Minor

The minor in Communication is offered by the Department of Communication. Communication is central to the pursuit of any field of study and to the mastery of the future for societies, commerce, cultures, relationships and the individual. All majors are welcome as Communication minors.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 200 level course (p. 761)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COMM 301</td>
<td>Rhetoric in Western Thought</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 3 or Theories of Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 300 to 499 (p. 761)</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
Communication and Global Media - Certificate

The Communication and Global Media Certificate (CGMC), is offered by the Department of Communication, and is designed to provide students with an understanding of a communication perspective on the impact of media in a global context. Media and communication sectors are the second largest export markets for the US, after defense and aerospace. The rise of the BRICI (Brazil, Russia, India, China, Indonesia) economies and the desire of businesses to capitalize on the growth of these markets is a prime example of the application of this certificate. The CGMC prepares students for understanding the growth and impact of communication and global media in a variety of similar contexts. Specific certificate requirements are available in the Office of Undergraduate Advising of the Department of Communication. Details are also available on the Department of Communication website (http://communication.tamu.edu).

Program Requirements

The CGMC requires designated courses and completion of a global internship or approved experience. Students must earn a grade of “B” or better in each course used to meet the requirements. Students who pursue the CGMC must complete all requirements prior to graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 335</td>
<td>Intercultural Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 365/</td>
<td>International Communication</td>
<td>3</td>
</tr>
<tr>
<td>JOUR 365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 458/</td>
<td>Global Media</td>
<td>3</td>
</tr>
<tr>
<td>JOUR 458</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select two of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>COMM 330</td>
<td>Technology and Human Communication</td>
<td></td>
</tr>
<tr>
<td>COMM 345/</td>
<td>Media Industries</td>
<td></td>
</tr>
<tr>
<td>FILM 345</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 354</td>
<td>Political Economy of Telecommunication</td>
<td></td>
</tr>
<tr>
<td>COMM 375</td>
<td>Media Audiences</td>
<td></td>
</tr>
<tr>
<td>COMM 452</td>
<td>Cultural Studies of Communication Technology</td>
<td></td>
</tr>
<tr>
<td>Other courses approved by CGMC committee for prescribed electives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Health Communication - Certificate

Careers in Health and in Communication are growing much faster than average according to the Office of Occupational Outlook, Bureau of Labor Statistics. Health communication skills are increasingly valuable in careers related to health and medicine, as well as the media, public relations, and strategic communication. Health communication skills are applicable for a variety of health and medical career tasks including provider-patient consultations; the formative research, design, implementation, and assessment of public health communication campaigns; the development of strategic communication initiatives for health organizations and related products and services; as well as leadership in public and private sector health agendas. Health messaging reaches diverse audiences and includes the use of advocacy to influence policy, as well as mediating and shaping public conversations on health issues both face-to-face and via traditional and new media in local and global arenas. Health communication skills are important for profit, nonprofit, and governmental organizations.

The Health Communication Certificate (HCC) Health Campaign/Policy Track provides a track for students interested in health campaigns, other forms of mediated health communication, and health policy. The Health Communication Certificate (HCC) Provider-Patient/ Organizational Track provides a track for students interested in
communication in healthcare organizations and provider-patient relationships. Specific certificate requirements are available in the Undergraduate Studies Office of the Department of Communication. Details are also available on the Department of Communication (http://communication.tamu.edu) website.

Program Requirements

Students must earn a grade of “B” or better in each course used to meet the requirements. Students who pursue the HCC must complete all requirements prior to graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required courses</strong></td>
<td></td>
</tr>
<tr>
<td>COMM 370</td>
<td>Health Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 470</td>
<td>Communication in Health Care Contexts</td>
<td>3</td>
</tr>
<tr>
<td>COMM 471</td>
<td>Media, Health and Medicine</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Electives</strong></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health Campaign/Policy track</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provider-Patient/Organizational track</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One semester or one summer of service learning</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Semester Credit Hours</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

Working with non-profit on health promotion/campaigns or in direct client contact for 5 hours per week for a minimum of 10 weeks. Must be approved in advance by the Director of Undergraduate Studies.

Program Requirements

Students must earn a grade of “B” or better in each course used to meet the requirements. Students who pursue the SCC must complete all requirements prior to graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td>COMM 322</td>
<td>Communication Tactics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 323</td>
<td>Strategic Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 325</td>
<td>Persuasion</td>
<td>3</td>
</tr>
<tr>
<td>COMM 375</td>
<td>Media Audiences</td>
<td>3</td>
</tr>
<tr>
<td>COMM 450</td>
<td>Media Campaigns</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Prescribed Elective Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication Leadership and Conflict Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Intercultural Communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication and Conflict</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Semester Credit Hours</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

Strategic Communication - Certificate

Strategic communication is the process that supports public relations, promotions, public information, marketing, corporate communication and advertising. Strategic communication is creation of the plan as well as the tools or tactics used to implement that plan effectively. The value of effective strategic communication is acknowledged by both profit and nonprofit corporations and by governmental agencies. The effect of strategic communication failures on the bottom line, on employee and stakeholder satisfaction, and on the efficient use of resources, is well documented. Gathering and interpreting appropriate information, audience analysis, as well as harnessing the power of accurate language in message crafting, are further noted as key strategic communication functions. Tactics available for implementing strategic communication are expanding exponentially as digital communication and new media evolve. Mastery of the integration of these tactics in strategic plans augment the effectiveness of internal and public issues management while mitigating corporate frustration, offensive messages, and overspending. Although effective strategic communication is critical to organizational success, many companies and agencies continue to need support and assistance in this arena. The U.S. Department of Labor Occupational Outlook Handbook notes that careers in various strategic communication areas are growing “faster than average” to “much faster than average.” The Certificate in Strategic Communication will prepare Communication and Telecommunication Media Studies majors to plan and execute communication strategically and to coordinate the integration of appropriate tactics to enhance commerce, government, and to further political, religious and social goals, as they lead us into the future. Specific certificate requirements are available in the Undergraduate Studies Office of the Department of Communication. Details are also available on the Department of Communication (http://communication.tamu.edu) website.

Department of Economics

The study of economics helps students develop a framework for understanding of how individuals, organizations and societies make choices and how those choices interact to determine the allocation of an economy’s limited resources among alternative competing
Economists study how these choices are made in a variety of environments and consider how the outcomes vary under alternative forms of economic organization. Economists evaluate the outcomes of an economic system on a scorecard that includes several different criteria such as efficiency, equity, and stability.

The fundamental goal of our curriculum is to introduce students to the economic way of thinking—a particular way of asking questions and analyzing problems. We offer a core set of courses that teach the fundamental theoretical tools of economics, and a set of elective courses that demonstrate how economists apply these tools to study a wide variety of real-world economic issues. A key takeaway for students is a working knowledge of a useful and coherent structural approach to examining current public policy issues and an ability to identify the inherent tradeoffs involved in developing solutions to major social problems.

The economic style of thinking, when combined with training in the required tools of quantitative and qualitative analysis, provides students with a skill set that will serve them well in a wide array of post-graduate pursuits. The banking and financial sectors regularly hire undergraduates economics majors as do management consulting firms. A number of private corporations employ economists to prepare forecasts of future movements in firm costs and profits. Government agencies—local, state, national, international—hire economics majors for positions as budget analysts or government program evaluators. The study of economics also provides sound preparation for graduate school, either a Masters or PhD degree in economics or a professional degree in business, law, or public policy.

**Faculty**

An, Yonghong, Assistant Professor
Economics
PHD, Johns Hopkins University, 2011

Barr, Andrew C, Assistant Professor
Economics
PHD, University of Virginia, 2015

Bento, Pedro M, Assistant Professor
Economics
PHD, University of Toronto, 2013

Brown, Alexander L, Associate Professor
Economics
PHD, California Institute of Technology, 2008

Castillo, Marco, Associate Professor
Economics
PHD, University of Wisconsin - Madison, 2001

Eckel, Catherine C, Professor
Economics
PHD, University of Virginia, 1983

Edwardson, Jeffrey C, Senior Lecturer
Economics
PHD, Texas A&M University, 2000

Fragiadakis, Daniel, Assistant Professor
Economics
PHD, Stanford University, 2014

Gan, Li, Professor
Economics
PHD, University of California, Berkeley, 1998

Glass, Amy J, Associate Professor
Economics
PHD, University of Pennsylvania, 1993

Gronberg, Timothy J, Professor
Economics
PHD, Northwestern University, 1978

Hoekstra, Mark L, Associate Professor
Economics
PHD, University of Florida, 2006

Hwang, Haeshin, Professor
Economics
PHD, University of Minnesota, Twin Cities, 1976

Jansen, Dennis W, Professor
Economics
PHD, University of North Carolina at Chapel Hill, 1983

Krasteva, Silvana S, Associate Professor
Economics
PHD, Duke University, 2009

Li, Qi, Professor
Economics
PHD, Texas A&M University, 1991

Lindo, Jason M, Associate Professor
Economics
PHD, University of California, Davis, 2009

Luco Echeverria, Fernando A, Assistant Professor
Economics
PHD, Northwestern University, 2014

Maness, Robert S, Visiting Associate Professor
Economics
PHD, Texas A&M University, 1992

Manjunath, Vikram, Assistant Professor
Economics
PHD, University of Rochester, 2011

Meckel, Katherine, Assistant Professor
Economics
PHD, Columbia University, 2015

Meer, Jonathan, Associate Professor
Economics
PHD, Stanford University, 2009

Pakhotina, Nataliya V, Lecturer
Economics
PHD, University of Florida, 2010

Petrie, Ragan, Associate Professor
Economics
PHD, University of Wisconsin - Madison, 2002
The Bachelor of Arts in Economics degree teaches students analytical thinking skills and their applications to better understand human behavior. The degree plan is designed to allow opportunities for applied exploration of economic principles and theory through research, internship, and study abroad opportunities. With classes that focus on analytical thinking and a foreign language requirement, students are prepared for a wide variety of post-graduate options including: international business, law school, government and public policy professions, and non-profit organizations.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 323</td>
<td>Microeconomic Theory</td>
<td>1</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Macroeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>Economics electives (p. 786)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td><strong>College and University Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Foreign Language (p. 465)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>SELECT ONE OF THE FOLLOWING:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 16  or Topics in Contemporary Mathematics II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td></td>
</tr>
<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
<td></td>
</tr>
<tr>
<td>ECMT 461</td>
<td>Economic Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture or creative arts (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>International and Cultural Diversity (p. 40)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Free Electives</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>
1 ECON 323 is a pre-requisite for most ECON electives
2 ECON 322 may not be applied toward the major.
3 No course can be counted in more than one category.
4 Courses do not satisfy the College of Liberal Arts Language, Philosophy and Culture requirement or Creative Arts requirement.
5 Must make a grade of C or better.
6 ECON 100-ECON 499 (p. 786) and ECMT 100-ECMT 499 (p. 786) may not be used to fulfill this requirement.
7 6 hours required. These courses may also be used to satisfy any other requirement.
8 The student may select any courses other than economics courses and ENGL 103 as free electives. No more than 11 credits of any combination of military, air or naval science and physical activity will be allowed to count as electives. Students may also use up to 13 hours of free electives to pursue a minor.

Total of 33 credits. No more than 36 credits in economics and econometrics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field (Economics and Econometrics coursework).

Economics - BS

The Bachelor of Science in Economics degree teaches students analytical thinking skills and their applications to better understand human behavior. The degree plan is designed to allow opportunities for applied exploration of economic principles and theory through research, internship, and study abroad while focusing on quantitative skills and the development of rational thought and critical thinking. At the completion of the degree, students are prepared for a wide variety of post-graduate professions.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 323</td>
<td>Microeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Macroeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td><strong>Economics electives</strong> 1,3</td>
<td></td>
<td>21</td>
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<tr>
<td>ECMT 463</td>
<td>Introduction to Econometrics 4</td>
<td></td>
</tr>
<tr>
<td>ECMT 475</td>
<td>Economic Forecasting</td>
<td></td>
</tr>
<tr>
<td>ECON 301 to 499 (p. 786)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 210</td>
<td>Survey of Managerial and Cost</td>
<td>3</td>
</tr>
<tr>
<td>Accounting Principles</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>College and University Requirements</strong> 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical</td>
<td></td>
</tr>
<tr>
<td>Professions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total of 33 credits. No more than 36 credits in economics and econometrics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field.

Economics - 5-Year Bachelor of Arts/ Master of International Affairs

The Joint-Degree Program between the Department of Economics and The Bush School of Government and Public Service allows undergraduate Economics students to enter the Master of International Affairs Program, with a focus in International Economics and Development, at the beginning of their fourth year at Texas A&M University. This program combines the teaching of analytical thinking skills and applications to better understand human behavior as it relates to international economic
development along with skills in diplomacy, research, and development of a global perspective.

Students will be required to complete the same two-year, 48-hour curriculum as other students admitted to the Bush School’s MIA program. Students will double-count 9 hours of Bush School courses toward the undergraduate major coursework area and up to 9 hours toward general electives in the Bachelor of Arts in Economics. At the completion of the joint degree, students are prepared for a wide variety of post-graduate opportunities including: employment in global commerce, government, government contracting, national security, and transfer pricing.

Students interested in this program will apply during the fall of their junior year and, if admitted, begin taking masters-level courses in the fall of their senior year with an undergraduate classification. Students are reclassified as degree seeking master's students upon completing 96 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Economics, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 323</td>
<td>Microeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Macroeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>Economics electives (p. 786)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td>College and University Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Foreign Language (p. 465)</td>
<td>14</td>
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1. ECON 323 is a pre-requisite for most ECON electives
2. ECON 322 may not be applied toward the major.
3. No course can be counted in more than one category.
4. Courses do not satisfy the College of Liberal Arts Language, Philosophy and Culture requirement or Creative Arts requirement.
5. Must make a grade of C or better.
6. ECON 100-ECON 499 (p. 786) and ECMT 100-ECMT 499 (p. 786) may not be used to fulfill this requirement.
7. 6 hours required. These courses may also be used to satisfy any other requirement.
8. The student may select any courses other than economics courses and ENGL 103 as free electives. No more than 11 credits of any combination of military, air or naval science and physical activity will be allowed to count as electives. Students may also use up to 13 hours of free electives to pursue a minor.

Total of 33 credits. No more than 36 credits in economics and econometrics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field (Economics and Econometrics coursework)

Students are reclassified as degree seeking master’s students upon completing 96 credit hours, typically in the following semester.

Students will double-count 9 hours of Bush School courses toward the undergraduate major coursework area and up to 9 hours toward general electives in the Bachelor of Arts in Economics.

**Economic Electives**

In addition to the electives for the BA in ECON, the following courses may be selected for the ECON-MIA program: BUSH 632, BUSH 635, INTA 608, INTA 616, INTA 625, INTA 630, INTA 632.

See the MIA program in the Graduate Catalog for MIA requirements.

**Economics - 5-Year Bachelor of Arts/Master of Public Service Administration**

The Joint-Degree Program between the Department of Economics and The Bush School of Government and Public Service allows undergraduate Economics students to enter the Master of Public Service Program, with a focus in Public Policy Analysis, at the beginning of their fourth year at Texas A&M University. This program combines the teaching of analytical thinking skills and applications to better understand human behavior as it relates to public policy and management along with skills in leadership and research methods.

Students will be required to complete the same two-year, 48-hour curriculum as other students admitted to the Bush School's MPSA program. Students will double-count 9 hours of Bush School courses...
toward the undergraduate major coursework area and up to 9 hours toward general electives in the Bachelor of Arts degree in Economics. At the completion of the joint degree, students are prepared for a wide variety of post-graduate opportunities including: employment in local, state or federal government, non-profit organizations, or government contracting.

Students interested in this program will apply during the fall of their junior year and, if admitted, begin taking masters-level courses in the fall of their senior year with an undergraduate classification. Students are reclassified as degree seeking master’s students upon completing 96 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Economics, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree.

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1. ECON 323 is a prerequisite for most ECON electives
2. ECON 322 may not be applied toward the major.
3. No course can be counted in more than one category.
4. Courses do not satisfy the College of Liberal Arts Language, Philosophy and Culture requirement or Creative Arts requirement.
5. Must make a grade of C or better.
6. ECON 100-ECON 499 (p. 786) and ECMT 100-ECMT 499 (p. 786) may not be used to fulfill this requirement.
7. 6 hours required. These courses may also be used to satisfy any other requirement.
8. The student may select any courses other than economics courses and ENGL 103 as free electives. No more than 11 credits of any combination of military, air or naval science and physical activity will be allowed to count as electives. Students may also use up to 13 hours of free electives to pursue a minor.

Total of 33 credits. No more than 36 credits in economics and econometrics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field (Economics and Econometrics coursework)

Students are reclassified as degree seeking master’s students upon completing 96 credit hours, typically in the following semester.

Students will double-count 9 hours of Bush School courses toward the undergraduate major coursework area and up to 9 hours toward general electives in the Bachelor of Arts degree in Economics.

**Economic Electives**

In addition to the electives for the BA in ECON, the following courses may be selected for the ECON-MPSA program: BUSH 632, BUSH 635; PSAA 621, PSAA 622, PSAA 638, PSAA 640, PSAA 674.

See the MPSA program in the Graduate Catalog for MPSA requirements.

**Economics - 5-Year Bachelor of Science/Master of International Affairs**

The Joint-Degree Program between the Department of Economics and The Bush School of Government and Public Service allows undergraduate Economics students to enter the Master of International Affairs Program, with a focus in International Economics and Development, at the beginning of their fourth year at Texas A&M University. This program combines the teaching of analytical thinking skills and applications to better understand human behavior as it relates to international economic development along with skills in diplomacy, research, and development of a global perspective.

Students will be required to complete the same two-year, 48-hour curriculum as other students admitted to the Bush School's MPIA program. Students will double-count 6 hours of Bush School courses toward the undergraduate major coursework area, 3 hours toward ECMT 463, and up to 9 hours toward general electives in the Bachelor of Science degree in Economics. At the completion of the joint degree, students are prepared for a wide variety of post-graduate opportunities.
including: employment in global commerce, government, government contracting, national security, and transfer pricing.

Students interested in this program will apply during the fall of their junior year and, if admitted, begin taking masters-level courses in the fall of their senior year with an undergraduate classification. Students are reclassified as degree seeking master's students upon completing 96 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Economics, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree.

### Program Requirements

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<td>Economic Forecasting</td>
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<td>ECON 301 to 499 (p. 786)</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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</tbody>
</table>

Total Semester Credit Hours: 120

1. ECON 322 may not be applied toward the major.
2. ECON 323 is a prerequisite for most ECON electives.
3. Must make a grade of C or better.
4. Student must complete ECMT 461 or equivalent STAT course (Pre-approved by an advisor) prior to ECMT 463.
5. No course can be counted in more than one category.
6. ECON 100-ECON 499 (p. 786) and ECMT 100-ECMT 499 (p. 786) may not be used to fulfill this requirement.
7. 6 required hours. These courses may also be used to satisfy any other requirement.
8. The student may select any courses other than economics courses and ENGL 103 as free electives. No more than 11 credits of any combination of military, air or naval science and physical activity will be allowed to count as electives. Students may also use up to 18 hours of free electives to pursue a minor.

Total of 33 credits. No more than 39 credits in economics and econometrics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field.

Students are reclassified as degree seeking master's students upon completing 96 credit hours, typically in the following semester.

Students will double-count 6 hours of Bush School courses toward the undergraduate major coursework area, 3 hours toward ECMT 463, and up to 9 hours toward general electives in the Bachelor of Science degree in Economics.

### Economic Electives

In addition to the electives for the BA in ECON, the following courses may be selected for the ECON-MIA program: BUSH 632, BUSH 635; INTA 608, INTA 616, INTA 625, INTA 630, INTA 632.

See the MIA program in the Graduate Catalog for MIA requirements.

### Economics - 5-Year Bachelor of Science/Master of Public Service Administration

The Joint-Degree Program between the Department of Economics and the Bush School of Government and Public Service allows undergraduate Economics students to enter the Master of Public Service Program, with a focus in Public Policy Analysis, at the beginning of their fourth year at Texas A&M University. This program combines the teaching of analytical thinking skills and applications to better understand human behavior as it relates to public policy and management along with skills in leadership and research methods.

Students will be required to complete the same two-year, 48-hour curriculum as other students admitted to the Bush School's MPSA program. Students will double-count 6 hours of Bush School courses toward the undergraduate major coursework area, 3 hours toward ECMT 463, and up to 9 hours toward general electives in Bachelor of Science degree in Economics. At the completion of the joint degree, students are prepared for a wide variety of post-graduate opportunities...
including: employment in local, state or federal government, non-profit organizations, or government contracting.

Students interested in this program will apply during the fall of their junior year and, if admitted, begin taking masters-level courses in the fall of their senior year with an undergraduate classification. Students are reclassified as degree seeking master's students upon completing 96 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Economics, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree.

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1. ECON 322 may not be applied toward the major.
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### Economic Electives

In addition to the electives for the BA in ECON, the following courses may be selected for the ECON-MPSA program: BUSH 631, BUSH 632, BUSH 635; PSAA 621, PSAA 622, PSAA 638, PSAA 663/AGEC 604, PSAA 674.

See the MPSA program in the Graduate Catalog for MPSA requirements.

### Economics - 5-Year Bachelor of Science/Master of Science in Economics

The Department of Economics offers a five year joint degree program that provides the opportunity to earn a Bachelor of Science in Economics and a Master of Science in Economics with a focus in either Financial Economics or Financial Econometrics. The MS in Economics Program is a professional, terminal masters degree focused on analytical and quantitative skills in the field of financial economics. In this program, the undergraduate degree requirements are slightly modified to require more mathematics courses in an effort to prepare students for the more rigorous masters-level coursework. Students will double count six hours of masters-level coursework toward the undergraduate degree and complete both the undergraduate degree and the 36-hour Masters degree in five years. At the completion of the degree, students are well-prepared for careers in the financial sector such as: trading analyst, financial consultant, data analyst, distribution analyst and loan administrator.
Students interested in this program will apply during the fall of their junior year and, if admitted, begin taking masters-level courses in the fall of their senior year with an undergraduate classification. Students are reclassified as degree seeking master’s students upon completing 96 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Economics, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 323</td>
<td>Microeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECON 410</td>
<td>Macroeconomic Theory</td>
<td>3</td>
</tr>
<tr>
<td>ECON 460</td>
<td>Introduction to Mathematical Economics</td>
<td>3</td>
</tr>
<tr>
<td>ECMT 475</td>
<td>Economic Forecasting</td>
<td>3</td>
</tr>
<tr>
<td>ECON 301 to 499</td>
<td>(p. 786)</td>
<td>12</td>
</tr>
<tr>
<td>ECON 607</td>
<td>Foundations of Microeconomic Theory</td>
<td>3</td>
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<tr>
<td>ECMT 674</td>
<td>Economic Forecasting</td>
<td>3</td>
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<tr>
<td>ACCT 209</td>
<td>Survey of Accounting Principles</td>
<td>3</td>
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<tr>
<td>ACCT 210</td>
<td>Survey of Managerial and Cost Accounting Principles</td>
<td>3</td>
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<tr>
<td>MATH 304</td>
<td>Linear Algebra</td>
<td>3</td>
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<tr>
<td>or MATH 32</td>
<td>or Linear Algebra</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<td>COMM 243</td>
<td>Argumentation and Debate</td>
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<tr>
<td>Literature in English</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>ECMT 461</td>
<td>Economic Data Analysis</td>
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<tr>
<td>ECMT 463</td>
<td>Introduction to Econometrics</td>
<td>3</td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>9</td>
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<tr>
<td>Creative arts (p. 24)</td>
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<td>3</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
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<tr>
<td>Language, philosophy and culture or creative arts (p. 23)</td>
<td></td>
<td>3</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td></td>
<td>8</td>
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<tr>
<td>American history (p. 25)</td>
<td></td>
<td>6</td>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
<td>International and cultural diversity (p. 40)</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

Free electives

Total Semester Credit Hours 122

1. ECON 322 may not be applied toward the major.
2. ECON 323 is a prerequisite for most ECON electives.
3. Highly recommended taking MATH 151/MATH 152 prior to Linear Algebra (MATH 304 / MATH 323). If other MATH is taken, you must consult with the MATH Department in order to register for MATH 304/MATH 323.
4. Other courses may quality. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. No course can be counted in more than one category.
5. MATH 151 and MATH 152 are four credit hour courses. Three hours will count toward the Mathematics requirement for each course and the remaining one hour for each course will count toward free electives.
6. Must make grade of C or better.
7. Six hours required. These courses may also be used to satisfy any other requirement.
8. The student may select any courses other than economics courses and ENGL 103 as free electives. No more than 11 credits of any combination of military, air, or naval science and physical activity will be allowed to count as electives.

Students are reclassified as degree seeking master’s students upon completing 96 credit hours, typically in the following semester.

Students enrolled in the BS-MS-ECON degree program may double count ECON 607 and ECMT 674 toward the undergraduate major requirements. Undergraduate students must take MATH 151 & MATH 152, and MATH 304 or MATH 323, in addition to the other University Core Curriculum, College of Liberal Arts, and Department of Economics-specific degree requirements.

Total of 33 credits. No more than 39 credits in economics and econometrics can be applied to this degree. A grade of C or higher is required for a course to be counted in the major field.

### Economics - Minor

The study of economics provides a rigorous structure for decision-making, whether on academic topics or day-to-day activities such as how to divide roommate expenses or how to allocate time between study and recreation. Economics teaches students how to think rationally about problems, a skill that is essential in any profession.

A minor in economics provides knowledge and information that will make a student a better-informed consumer and participant in the world economy. It also provides a basis for a better understanding of world events.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>
Students must make a grade of "C" or better in all courses.

Business Economics - Certificate

The Business Economics Certificate (BEC) is an innovative program designed to prepare students for successful careers in a rapidly changing economic environment. The certificate combines a foundation in Economics in the College of Liberal Arts with a business minor in the Mays College of Business, integrating the practical skills taught in business courses with the analytical tools of economics.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required courses</td>
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<td></td>
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<tr>
<td>ECMT 463</td>
<td>Introduction to Econometrics 1</td>
<td>3</td>
</tr>
<tr>
<td>ECMT 475</td>
<td>Economic Forecasting 2,3</td>
<td>3</td>
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<tr>
<td>Prescribed electives</td>
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<td></td>
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<tr>
<td>ECON 315</td>
<td>Sports Economics</td>
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<tr>
<td>ECON 420</td>
<td>Law and Economics</td>
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<td>ECON 425</td>
<td>The Organization of Industry</td>
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<tr>
<td>ECON 426</td>
<td>Economics of Antitrust and Regulation</td>
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<tr>
<td>ECON 433</td>
<td>Energy Markets and Policy</td>
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<tr>
<td>ECON 445</td>
<td>Financial Economics</td>
<td></td>
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<tr>
<td>ECON 449</td>
<td>Economics of Decision-Making Strategy</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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</tr>
</tbody>
</table>

1. Student must complete ECMT 461 or equivalent STAT course (pre-approved by an advisor) prior to ECMT 463.
2. ECMT 461 and ECMT 463 are prerequisites for this course.
3. ECMT 475 and the required six hours of electives may also be used to satisfy the Economics electives requirement.
4. ECON 323 is a pre-requisite for all 400-level ECON courses.

Students pursing this certificate must also complete a minor in Business Administration (BUAD) (p. 240).

Quantitative Economic Methods - Certificate

The Quantitative Economic Methods certificate program prepares students for entry into an economics Ph.D. program or highly quantitatively-oriented occupation such as economic consulting and research. Students select from a set of courses in the Statistics and Mathematics departments to broaden their understanding of the fundamental basis of advanced economics. In addition, students are required to take several intensive economics courses focused on mathematical and statistical topics. Students interested in this certificate are also strongly encouraged to participate in undergraduate research activities in the Department of Economics.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required courses</td>
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<td></td>
</tr>
<tr>
<td>ECMT 475</td>
<td>Economic Forecasting 1</td>
<td>3</td>
</tr>
<tr>
<td>ECON 460</td>
<td>Introduction to Mathematical Economics 2</td>
<td>3</td>
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<tr>
<td>ECON 470</td>
<td>Program Evaluation</td>
<td>3</td>
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<tr>
<td>Select three of the following: 3</td>
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<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
<td></td>
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<tr>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
<td></td>
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<tr>
<td>MATH 304</td>
<td>Linear Algebra</td>
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<tr>
<td>MATH 323</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 409</td>
<td>Advanced Calculus I</td>
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<tr>
<td>STAT 414</td>
<td>Mathematical Statistics I</td>
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<tr>
<td>STAT 415</td>
<td>Mathematical Statistics II</td>
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<tr>
<td>Total Semester Credit Hours</td>
<td>18</td>
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</tbody>
</table>

1. ECMT 461 and ECMT 463 are prerequisites for this course.
2. Completion of MATH 151 and higher is suggested when enrolling in this course.
3. All MATH and STAT courses listed require a minimum of MATH 151 and MATH 152.

Department of English

The study of English language and literature is central to an understanding of our culture and our relationship to it. Mastery of the English language is essential to all of us at Texas A&M, no matter what our interests or profession. An awareness of our heritage as it is embodied in great literary works provides us with a sense of the traditions, ideas, and rhetorics that have shaped us and our world; it enables us to define ourselves and our values in relation to this valued past. The Department of English offers students an opportunity to explore our linguistic and literary inheritance. Courses are offered in British literature, American literature, rhetoric and composition, creative writing, literary criticism, linguistics, and film. Students can discover the roots of the English language or learn about the latest linguistic theories. They can acquire the skills necessary to be a technical writer and editor or begin to learn the craft of writing poetry and fiction. They can immerse themselves in literature from Beowulf to Virginia Woolf, from Captain John Smith to Toni Morrison; and they can explore the extensions and challenges to tradition found in women's writing, ethnic literature, and postmodernist experimentation. Students also may explore literature in relation to the other arts and religion and culture, and investigate the global through studies in Asian, Africana, Caribbean, postcolonial, transnational and other literatures. The flexibility of the degree in English and the options available in the department enable students to pursue...
their own interests while acquiring important analytic and writing skills
and discovering the riches of our literary heritage.

English graduates, with relevant minors or specialized courses outside
English, may pursue careers in technical writing, editing and publishing,
government service, public relations, personnel work, and advertising
or administrative positions in business and industry. The program in
English also provides excellent preparation for later professional training
in law, medicine, business and the ministry, as well as for graduate
work in information studies and in the humanities, including English.
Supported by work in the College of Education and Human Development,
the English program also may lead to careers in teaching or educational
administration.

The curriculum in English is designed to allow students to develop
concentrations in such areas as composition and rhetoric, creative
writing, linguistics, literature and film, or coursework relevant to teacher
certification.

**Teacher Certification Programs in English**

**Teacher Certification in English Language Arts/Reading - OPTION II (Secondary)**

Students desiring certification by Option II to teach English language
arts and reading in the secondary schools of Texas should consult
an undergraduate English advisor as early as possible. Requirements
include 27 semester hours in literature, language, reading, and rhetoric
and composition (an optional 24-30 hours in a second teaching field is
possible); and professional education courses.

**Degree and Certification Program for Middle School in
English Language Arts/Reading**

The Department of English offers a degree and certification program in
English language arts/reading for prospective middle-school teachers.
This program requires 36 hours of literature, linguistics, composition
and rhetoric and 15 hours of reading along with an 18-hour professional
education component.

All students seeking certification should consult an undergraduate
English advisor for additional information.

**Professional Writing Certificate**

The Professional Writing Certificate gives students 18 hours of intensive
training in a broad range of communication skills. Students who
achieve a grade of B or better in all 18 hours of coursework will receive
a certificate signifying their successful completion of this training.
Students should allow at least a year and a half to complete the
courses, some of which are offered only once a year. Transfer courses,
independent studies and credit by exam cannot be counted toward the
18 hours. Required courses include ENGL 210, ENGL 320, ENGL 241
and ENGL 355. With the help of the Professional Writing Certificate
Advisor, the student must also select two additional courses in rhetoric,
communication or a related field.

**Faculty**

Alonzo, Juan J, Associate Professor
English
PHD, The University of Texas at Austin, 2003

Balester, Valerie M, Professor
English
PHD, The University of Texas at Austin, 1998

Bhattacharya, Nandini, Professor
English
PHD, University of Rochester, 1992

Blackwell, Catherine S, Lecturer
English
PHD, Texas Tech University, 2012

Boenig, Robert E, Professor
English
PHD, Rutgers, The State University of New Jersey, 1978

Carly-Miles, Claire I, Lecturer
English
PHD, Texas A&M University, 2008

Clark, William B, Professor
English
PHD, Louisiana State University, 1973

Collins, Michael S, Professor
English
PHD, Columbia University, 1999

Cooper, Rich P, Lecturer
English
PHD, Louisiana State University, 2011

Dicaglio, Joshua M, Assistant Professor
English
PHD, The Pennsylvania State University, 2016

Dicaglio, Sara, Instructional Assistant Professor
English
PHD, The Pennsylvania State University, 2016
MFA, University of Michigan, 2008

Dickson, Donald R, Professor
English
PHD, University of Illinois at Urbana-Champaign, 1981

Duplessis, Nicole M, Lecturer
English
PHD, Texas A&M University, 2008

Dworkin, Ira M, Assistant Professor
English
PHD, City University of New York, 2003

Earhart, Amy E, Associate Professor
English
PHD, Texas A&M University, 1999

Egenolf, Susan B, Associate Professor
English
PHD, Texas A&M University, 1995

Eide, Marian, Associate Professor
English
PHD, University of Pennsylvania, 1994
Estill, Laura A, Associate Professor
English
PHD, Wayne State University, 2010

Ezell-Mainzer, Margaret, Distinguished Professor
English
PHD, Cambridge University, 1981

Francis, James, Lecturer
English
PHD, Middle Tennessee State University, 2010

Griffin, Robert J, Associate Professor
English
PHD, Yale University, 1985

Harris, Jason M, Instructional Assistant Professor
English
MFA, Bowling Green State University, 2014
PHD, University of Washington, 2001

Hoagwood, Terence A, Professor
English
PHD, University of Maryland, 1979

Hodgson, Lucia K, Assistant Professor
English
PHD, University of Southern California, 2009

Howell, Jessica M, Associate Professor
English
PHD, University of California, Davis, 2008

Ives, Maura C, Professor
English
PHD, University of Virginia, 1990

Jackson, Shona N, Associate Professor
English
PHD, Stanford University, 2005

Johansen Aase, Emily J, Associate Professor
English
PHD, McMaster University, 2008

Kallendorf, Craig W, Professor
English
PHD, University of North Carolina at Chapel Hill, 1982

Kendall, Shari E, Associate Professor
English
PHD, Georgetown University, 1999

Mandell, Laura C, Professor
English
PHD, Cornell University, 1992

Matthews, Pamela R, Professor
English
PHD, Duke University, 1988

McWhirter, David B, Professor
English
PHD, University of Virginia, 1984

Mize, Britt A, Associate Professor
English
PHD, The University of North Carolina at Chapel Hill, 2003

Morey, Anne M, Associate Professor
English
PHD, The University of Texas at Austin, 1998

Nair, Dimple, Lecturer
English
MA, University of Mysore (India), 1997

Nelson, Claudia B, Professor
English
PHD, Indiana University, 1989

O’Farrell, Mary A, Associate Professor
English
PHD, University of California, Berkeley, 1991

Pattison, Kalani K, Lecturer
English
PHD, Baylor University, 2016

Perry, Nandra L, Associate Professor
English
PHD, University of North Carolina at Chapel Hill, 2003

Pfuntner, Deborah L, Lecturer
English
PHD, Texas A&M University, 2016

Pilsch, Andrew T, Assistant Professor
English
PHD, The Pennsylvania State University, 2011

Reddy, Vanita D, Associate Professor
English
PHD, University of California, Davis, 2009

Reynolds, Larry J, Distinguished Professor
English
PHD, Duke University, 1974

Robinson, Elizabeth K, Instructional Professor
English
PHD, Texas A&M University, 1995

Robinson, Sally A, Associate Professor
English
PHD, University of Washington, 1989

Ross, Shawna M, Assistant Professor
English
PHD, The Pennsylvania State University, 2011

Rowell, Charles H, Professor
English
PHD, The Ohio State University, 1972

Rozier, James T, Lecturer
English
PHD, University of Mississippi, 2015
Scala, Jodi G, Lecturer
English
PHD, University of Mississippi, 2007
MFA, Bowling Green State University, 2003

Stabile, Susan M, Associate Professor
English
PHD, University of Delaware, 1997

Trninic, Marina, Lecturer
English
PHD, Texas A&M University, 2013

Tuhkanen, Mikko J, Associate Professor
English
PHD, State University of New York at Buffalo, 2005

Vasilakis, Apostolos, Instructional Associate Professor
English
PHD, Emory University, 2004

Warren, Nancy B, Professor
English
PHD, Indiana University, 1997

White, Lowell M, Instructional Assistant Professor
English
PHD, Texas A&M University, 2010

Wilton, David R, Lecturer
English
PHD, University of Toronto, 2016

Wollock, Jennifer G, Professor
English
PHD, Harvard University, 1981

Majors

- Bachelor of Arts in English (p. 507)
- Bachelor of Arts in English, Middle School Teacher Certification (p. 508)

Minors

- English Minor (p. 510)

English - BA

The curriculum in English is designed to allow students to develop concentrations in such areas as composition and rhetoric, creative writing, literature and film, or coursework relevant to teacher certification.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
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</tr>
<tr>
<td>ENGL 303</td>
<td>Approaches to English Studies</td>
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<tr>
<td></td>
<td>Literary Histories I</td>
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<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td>ENGL 221/</td>
<td>World Literature</td>
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<tr>
<td>MODL 221</td>
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<table>
<thead>
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<tbody>
<tr>
<td></td>
<td><strong>Literary Histories II</strong></td>
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<tr>
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<td>Select one of the following:</td>
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<td>ENGL 222/</td>
<td>World Literature</td>
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<td>MODL 222</td>
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<tr>
<td>ENGL 232</td>
<td>Survey of English Literature II</td>
<td></td>
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<tr>
<td>ENGL 316</td>
<td>Eighteenth-Century Literature and Culture</td>
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<tr>
<td>ENGL 321</td>
<td>Nineteenth-Century Literature (Romantic)</td>
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<tr>
<td>ENGL 322</td>
<td>Nineteenth-Century Literature (Victorian)</td>
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<tr>
<td>ENGL 323</td>
<td>The American Renaissance</td>
<td></td>
</tr>
<tr>
<td>ENGL 375</td>
<td>Nineteenth-Century American Novel</td>
<td></td>
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<tr>
<td>ENGL 377</td>
<td>The British Novel to 1870.</td>
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<table>
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<tr>
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<tr>
<td></td>
<td><strong>Literary Histories III</strong></td>
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<tr>
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<td>Select one of the following:</td>
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<tr>
<td>ENGL 204/</td>
<td>Introduction to African-American Literature</td>
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<tr>
<td>AFST 204</td>
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<td>ENGL 205/</td>
<td>Introduction to Africana Literature</td>
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<td>AFST 205</td>
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<tr>
<td>ENGL 329/</td>
<td>African-American Literature</td>
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<tr>
<td>AFST 329</td>
<td>Pre-1930</td>
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</tbody>
</table>
ENGL 333/ WGST 333: Gay and Lesbian Literature
ENGL 338: American Ethnic Literature
ENGL 339/ AFST 339: African-American Literature
AFST 339: Post-1930
ENGL 357: Native American Rhetorics and Literatures
ENGL 362/ HISP 362: Latino/a Literature
ENGL 374/ WGST 374: Women Writers
ENGL 391: Folklore, Literature, and World Cultures
ENGL 393/ AFST 393: Studies in Africana Literature and Culture
ENGL 474/ WGST 474: Studies in Women Writers
ENGL 481: Senior Seminar

Major concentration/electives
Select five of the following:
ENGL 100-ENGL 499 (p. 792)
LING 200-LING 499 (p. 868)

College and University Requirements
Select one of the following:
ENGL 104: Composition and Rhetoric
ENGL 210: Technical and Business Writing
COMM 203: Public Speaking
COMM 205: Communication for Technical Professions
COMM 243: Argumentation and Debate
ENGL 203: Writing about Literature
Foreign language (p. 465) 14
Mathematics (p. 22) 2 6
Life and physical sciences (p. 22) 9
Creative arts (p. 24) 3
Language, philosophy and culture (p. 23) 3
Language, philosophy and culture or creative arts (p. 23) 3
Social behavioral sciences (p. 25) 6
POLS 206: American National Government 3
POLS 207: State and Local Government 3
American history (p. 25) 6
General electives (may include optional minor) 4,4 25
International and cultural diversity (p. 40) 5

Total Semester Credit Hours 120

1 Majors must complete two ENGL courses formally designated as writing intensive.
2 At least 3 hours must be in MATH. Three hours may be PHIL 240.
3 Middle School Certificate seekers should consult an undergraduate English advisor for required courses.
4 Up to 12 hours of ENGL 300-499 courses may be used.
5 International and cultural diversity (p. 40) courses may also be used to satisfy any other requirement.

Up to 51 credits in English can be applied to the degree; at least 21 credits must be in literature. A grade of C or higher is required for a course to be counted in the major. For residency, a student must have at least 12 hours in 300- or 400-level English classes from Texas A&M University.

College and University Requirements
Other courses may qualify for the following categories. All courses are to be selected with the approval of the student’s academic advisor. The courses incorporate University Core Curriculum (p. 21) requirements. No course can be counted in more than one category, except as allowed in the minor field of study and the International and Cultural Diversity (p. 40) graduation requirement. A minimum of 36 hours of 300- or 400-level coursework must be completed at Texas A&M University, with at least 12 of those hours being in the major.

Minor Field of Study
English majors are advised, but not required, to select a minor field of study. Students who elect to complete a minor should contact the department or program that offers the minor to determine the requirements for that minor. A grade of C or higher is required for a course to be counted in the minor field. A minor field must be declared before the student has completed 75 credit hours.

English - BA, Middle School Teacher Certification
The Department of English offers a degree and certification program in English language arts/reading for prospective middle-school teachers. This program requires 36 hours of literature, linguistics, composition and rhetoric and 15 hours of reading along with an 18-hour professional education component.

All students seeking certification should consult an undergraduate English advisor for additional information.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Required Courses 1</td>
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<tr>
<td>ENGL 303</td>
<td>Approaches to English Studies</td>
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<tr>
<td>Literary Histories I</td>
<td></td>
<td></td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>ENGL 221/</td>
<td>World Literature</td>
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<tr>
<td>MODL 221</td>
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<td></td>
</tr>
<tr>
<td>ENGL 227</td>
<td>American Literature: The Beginnings to Civil War</td>
<td></td>
</tr>
<tr>
<td>ENGL 231</td>
<td>Survey of English Literature I</td>
<td></td>
</tr>
<tr>
<td>ENGL 313</td>
<td>Medieval English Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 314</td>
<td>The English Renaissance</td>
<td></td>
</tr>
<tr>
<td>ENGL 315</td>
<td>Seventeenth-Century Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 317</td>
<td>Early British Drama</td>
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</tr>
<tr>
<td>ENGL 353</td>
<td>History of Rhetoric</td>
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<tr>
<td>ENGL 412</td>
<td>Studies in Shakespeare</td>
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</tr>
<tr>
<td>ENGL 414</td>
<td>Milton</td>
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<tr>
<td>ENGL 431</td>
<td>Chaucer</td>
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Literary Histories II
Select one of the following: 3

<table>
<thead>
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<tbody>
<tr>
<td>ENGL 222/</td>
<td>World Literature</td>
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<tr>
<td>MODL 222</td>
<td></td>
</tr>
<tr>
<td>ENGL 232</td>
<td>Survey of English Literature II</td>
</tr>
<tr>
<td>ENGL 316</td>
<td>Eighteenth-Century Literature and Culture</td>
</tr>
<tr>
<td>ENGL 321</td>
<td>Nineteenth-Century Literature (Romantic)</td>
</tr>
<tr>
<td>ENGL 322</td>
<td>Nineteenth-Century Literature (Victorian)</td>
</tr>
<tr>
<td>ENGL 323</td>
<td>The American Renaissance</td>
</tr>
<tr>
<td>ENGL 373</td>
<td>American Realism and Naturalism</td>
</tr>
<tr>
<td>ENGL 375</td>
<td>Nineteenth-Century American Novel</td>
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<td>ENGL 377</td>
<td>The British Novel to 1870.</td>
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Literary Histories III
Select one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ENGL 228</td>
<td>American Literature: Civil War to Present</td>
</tr>
<tr>
<td>ENGL 305</td>
<td>Texas Literature</td>
</tr>
<tr>
<td>ENGL 336</td>
<td>Life and Literature of the Southwest</td>
</tr>
<tr>
<td>ENGL 337</td>
<td>Life and Literature of the American South</td>
</tr>
<tr>
<td>ENGL 340</td>
<td>Modern and Contemporary Drama</td>
</tr>
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<td>ENGL 350</td>
<td>Twentieth-Century Literature to World War II</td>
</tr>
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<td>ENGL 352</td>
<td>Literature, World War II to Present</td>
</tr>
<tr>
<td>ENGL 356/</td>
<td>Literature and Film</td>
</tr>
<tr>
<td>FILM 356</td>
<td></td>
</tr>
<tr>
<td>ENGL 372</td>
<td>American Poetry</td>
</tr>
<tr>
<td>ENGL 376</td>
<td>The American Novel Since 1900</td>
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<tr>
<td>ENGL 378</td>
<td>The British Novel, 1870 to Present.</td>
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<tr>
<td>ENGL 379/</td>
<td>Postcolonial Literatures</td>
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<tr>
<td>AFST 379</td>
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<td>ENGL 401</td>
<td>Contemporary Literary Theory</td>
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Literary Histories IV
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<table>
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<th>Course Code</th>
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<tr>
<td>ENGL 204/</td>
<td>Introduction to African-American Literature</td>
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<tr>
<td>AFST 204</td>
<td>Literature</td>
</tr>
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<td>ENGL 205/</td>
<td>Introduction to Africana Literature AFST 205</td>
</tr>
<tr>
<td>ENGL 329/</td>
<td>African-American Literature AFST 329 Pre-1930</td>
</tr>
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<td>AFST 329</td>
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<tr>
<td>ENGL 333/</td>
<td>Gay and Lesbian Literature</td>
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<td>WGST 333</td>
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<td>ENGL 338</td>
<td>American Ethnic Literature</td>
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<td>ENGL 339/</td>
<td>African-American Literature Post-1930 AFST 339</td>
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<td>ENGL 357</td>
<td>Native American Rhetorics and Literatures</td>
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<td>ENGL 362/</td>
<td>Latino/a Literature</td>
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<td>HISP 362</td>
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<td>ENGL 374/</td>
<td>Women Writers</td>
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<td>WGST 374</td>
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<tr>
<td>ENGL 391</td>
<td>Folklore, Literature, and World Cultures</td>
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ENGL 393/ AFST 393: Studies in Africana Literature and Culture
ENGL 474/ WGST 474: Studies in Women Writers
ENGL 481: Senior Seminar
Select four of the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ENGL 100</td>
<td>ENGL 499 (p. 792)</td>
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<tr>
<td>LING 200</td>
<td>LING 499 (p. 868)</td>
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Supporting Coursework

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<tr>
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<tr>
<td>RDNG 371</td>
<td>Multicultural and Interdisciplinary Literature</td>
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<tr>
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<td>for Middle Grades</td>
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<tr>
<td>RDNG 372</td>
<td>Reading and Writing across the Middle Grades</td>
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<tr>
<td></td>
<td>Curriculum</td>
</tr>
<tr>
<td>RDNG 461</td>
<td>Teaching Reading Through</td>
</tr>
<tr>
<td></td>
<td>Children's Literature</td>
</tr>
<tr>
<td>RDNG 470</td>
<td>Reading/Language Arts Methods in Middle Grades</td>
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<tr>
<td></td>
<td>Education</td>
</tr>
<tr>
<td>RDNG 490</td>
<td>Assessment in Reading Instruction in Middle</td>
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Teaching requirement

<table>
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<tr>
<td>EDCI 354</td>
<td>Early Childhood and Adolescent Curriculum and</td>
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<tr>
<td></td>
<td>Lesson Design</td>
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<tr>
<td>TEFB 371</td>
<td>Dynamics and Management in Multicultural/</td>
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<tr>
<td></td>
<td>Inclusionary Learning Environments</td>
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<tr>
<td>MEFB 452</td>
<td>Curriculum and Instruction for Middle Grades</td>
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<tr>
<td>INST 362</td>
<td>English as a Second Language Methods I</td>
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<td>MEFB 497</td>
<td>Supervised Clinical Teaching</td>
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College and University Requirements
Select one of the following: 3

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
</tr>
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<td>Foreign language (p. 465)</td>
</tr>
<tr>
<td></td>
<td>Mathematics (p. 22)</td>
</tr>
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<td></td>
<td>Life and physical sciences (p. 22)</td>
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<td></td>
<td>Creative arts (p. 24)</td>
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<td>Language, philosophy and culture (p. 23)</td>
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<tr>
<td></td>
<td>Language, philosophy and culture or creative</td>
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<td>arts (p. 23)</td>
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<td>INST 210</td>
<td>Understanding Special Populations</td>
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<tr>
<td>INST 222</td>
<td>Foundations of Education in a Multicultural</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td></td>
<td>American history (p. 25)</td>
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</tbody>
</table>

Texas A&M University Undergraduate Catalog
International and cultural diversity (p. 40)  

Total Semester Credit Hours 125

1 Majors must complete two ENGL courses formally designated as writing intensive.
2 At least 3 hours must be in MATH. Three hours may be PHIL 240.
3 International and cultural diversity courses may also be used to satisfy any other requirement.

Up to 36 credits in English can be applied to the degree; at least 21 credits must be in literature. A grade of C or higher is required for a course to be counted in the major. For residency, a student must have at least 12 hours in 300- or 400-level English classes from Texas A&M University.

College and University Requirements

Other courses may qualify for the following categories. All courses are to be selected with the approval of the student’s academic advisor. The following lists incorporate University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the minor field of study and the International and Cultural Diversity Graduation requirement. A minimum of 36 hours of 300- or 400-level coursework must be completed at Texas A&M University, with at least 12 of those hours being in the major.

English - Minor

Students seeking to minor in English should consult with their advisor and with the Office of Undergraduate Studies in English.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 100 to 499 (p. 792)</td>
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<td></td>
</tr>
<tr>
<td>ENGL 300 to 499 (p. 792)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

A grade of C or higher is required for a course to be counted in the minor field of study.

Department of Hispanic Studies

At a time when worldwide globalization includes the demographically and culturally significant Hispanization of Texas, along with other areas of the United States, the study of the Spanish language and Hispanic culture is important to achieve an understanding of the world in which we live. The mission of the Department of Hispanic Studies is to create and disseminate knowledge about the cultures and languages of the Hispanic world. Our research agenda includes Hispanic contemporary and period literature, film and performance, photography, iconography and digital humanities, cultural studies, gender and diaspora studies, and the history and presence of Spanish in the United States. We offer a Bachelor of Arts in Spanish, a Minor in Spanish, and a Minor in Hispanic Studies for Community Engagement. The development of proficiency in the Spanish language is at the core of all these programs.

With class sizes that rarely exceed 30 students, we are recognized for our excellent teaching and personalized attention to student needs. Our department offers a full range of courses for undergraduates, including language instruction and content courses in literature, culture, professional Spanish, and linguistics. An undergraduate major in Spanish can show future employers and/or graduate schools that a student has achieved a high level of linguistic ability and understanding of Hispanic cultures. The undergraduate major is designed to help students grow in their oral and written language skills as they learn more about Hispanic cultures through literature and cultural studies. This kind of study is valuable for those who plan to go into international careers or for those who plan to work with Hispanic populations in the United States. A Spanish major is useful in careers such as banking, advertising, marketing, journalism, health services, government, social welfare and public administration, and it is an excellent preparation for professional school in medicine, law, and business. Teaching certification is available to Spanish majors through the College of Education and Human Development.

The department insists on a high level of language competence as the basis for other intellectual growth in the discipline and requires a 10-week experience abroad. To help facilitate the fulfillment of this requirement, the department sponsors a summer study abroad program for credit in a variety of locations, such as Costa Rica, Chile, Ecuador, Mexico, and Spain. Semester and year-long study abroad programs, reciprocal exchanges and internships are also available and encouraged.

Spanish Bilingual/Bicultural Enhancement Initiative

The Hispanic Studies faculty recommends that Spanish language students, especially heritage speakers of Spanish and Advanced Placement (AP) students, take a healthy mixture of coursework related, on the one hand, to achieving University-level linguistic competence in the language; and coursework related to the Hispanic or Latino cultural experience on the other. To this end students select from courses on language, grammar and culture in spoken and written Spanish and electives which broaden the Hispanic/Latino knowledge base taught in English. A prudent and timely selection of courses can allow the student to apply coursework taken in the pursuit of bilingual/biculturalism to satisfy some requirements on the student’s degree plan. Many of the suggested courses will apply in the Core Curriculum, for example, in areas such as Humanities and Social Sciences. Discussions with a departmental advisor can help students to focus the best possible fit of coursework with their interests and degree plan.

HISP and SPAN Courses

Reflective of its dual mission of striving to provide students with opportunities for cultural and linguistic competence, the Department of Hispanic Studies offers courses under two different rubrics, HISP (p. 834) and SPAN (p. 964). HISP (p. 834) courses cover a variety of topics pertinent to Hispanic culture, such as food, film, literature in translation, music and visual culture, as well as social and political issues; they are offered in English. SPAN (p. 964) courses are conducted in Spanish, and while they also deal with cultural topics ranging from literature to visual culture, they emphasize aspects of language and linguistic development.

Required Foreign Language Placement Test

Students who intend to enroll for the first time in a college foreign language course, who have previous knowledge of the language, however acquired, and who have no college credit in the language MUST take a placement test to determine the appropriate course for their level of ability. The foreign language placement test also serves as a basis for the credit by examination.
Students who take the Advanced Placement (AP) test or other acceptable tests which grant college-level credit in Spanish do not have to take the required foreign language placement test, as the results of these tests may be used for placement, but they are encouraged to do so nonetheless. Heritage learners, or those who have acquired any level of Spanish outside of a formal academic setting, are also expected to take the exam to guarantee correct placement.

The Spanish Language Placement Test is administered by the Department of Hispanic Studies on the Pre-Conference Day of the New Student Conference, along with other credit-by-examination tests. The test is also offered twice per week during the fall and spring semesters. Students who do not take the placement test on the Pre-Conference Day will not be able to register for a foreign language course during their first semester.

**International students whose native language is not English** are exempted from satisfying the University foreign language requirement. These students are not allowed to register in those courses in their native language (101, 102) which are used to fulfill that requirement.

**Faculty**

Arizpe, Norma L, Senior Lecturer  
Hispanic Studies  
MA, University of Michigan, 1977

Arizpe, Victor, Professor  
Hispanic Studies  
PHD, University of Michigan, 1982

Curry, Richard K, Associate Professor  
Hispanic Studies  
PHD, Arizona State University, 1982

Espina, Eduardo D, Professor  
Hispanic Studies  
PHD, Washington University in St. Louis, 1987

Galdo, Juan, Associate Professor  
Hispanic Studies  
PHD, University of Colorado, 2003

Granja-Falconi, Fanny P, Lecturer  
Hispanic Studies  
PHD, Rutgers, The State University of New Jersey, 2010

Imhoff, Brian J, Associate Professor  
Hispanic Studies  
PHD, University of Illinois at Urbana-Champaign, 1996

Kallendorf, Hilaire A, Professor  
Hispanic Studies  
PHD, Princeton University, 2000

Lawo-Sukam, Alain, Associate Professor  
Hispanic Studies  
PHD, University of Illinois at Urbana-Champaign, 2005

Luiselli, Alessandra, Professor  
Hispanic Studies  
PHD, University of New Mexico, 1990

Miller, Stephen J, Professor  
Hispanic Studies  
PHD, The University of Chicago, 1976

Misemer, Sarah M, Associate Professor  
Hispanic Studies  
PHD, University of Kansas, 2001

Mitchell, Timothy J, Professor  
Hispanic Studies  
PHD, State University of New York at Buffalo, 1986

Moreiras, Alberto, Professor  
Hispanic Studies  
PHD, University of Georgia, 1987

Moyna, Maria I, Associate Professor  
Hispanic Studies  
PHD, University of Florida, 2000

Ortega-Aguilar, Dionisio B, Instructional Assistant Professor  
Hispanic Studies  
PHD, Stanford University, 1986

Quintana, Maria E, Associate Professor  
Hispanic Studies  
PHD, University of California, Berkeley, 1998

Rouleau, Brian J, Associate Professor  
Hispanic Studies  
PHD, University of Pennsylvania, 2010

Timmons, Patricia L, Instructional Associate Professor  
Hispanic Studies  
PHD, The University of Texas at Austin, 2004

Vilaros, Teresa M, Professor  
Hispanic Studies  
PHD, University of Georgia, 1989

Villalobos, Jose P, Associate Professor  
Hispanic Studies  
PHD, University of California, Irvine, 1998

Zapata, Gabriela C, Associate Professor  
Hispanic Studies  
PHD, The Pennsylvania State University, 2002

**Majors**

- Bachelor of Arts in Spanish (p. 511)

**Minors**

- Hispanic Studies for Community Engagement Minor (p. 513)
- Spanish Minor (p. 514)

**Spanish - BA**

A Spanish major provides students with language skills that translate into a practical tool for use in our increasingly bilingual landscape, whether this be Texas, the American Southwest, one of the many areas in the U.S. with large Spanish-speaking populations, or beyond our borders where over 400 million Spanish speakers reside. Above the practical aspect of the major, students of Spanish acquire a rich view of the world
in which we live. Focusing on analytical and critical thinking, as well as cultural awareness, our students are prepared for graduate studies in Spanish and professional schools (medicine, law, business), and for professions in fields such as education, business, human resources, research, government, social service, tourism, journalism, and translation. To enhance their career options, Spanish majors are encouraged to seek out a complementary minor or second major/degree, to create even more opportunities after graduation. Similarly, students can also complete an internship that will provide practical hands-on experience.

The Spanish major consists of 33 hours of major coursework plus 38 hours of general supporting electives. The 33 hours are divided into 6 lower division hours (Spanish 201 or 221; 202 or 203 or 222) plus 27 hours that are equally distributed among Spanish language or linguistics (9 hours), Spanish literature or culture (9 hours), and approved related electives (9 hours). At least 9 of these 27 hours must be in 400-level Spanish courses. The 38 hours of general supporting electives can come from any of the university’s offerings and may be taken as a minor or part of a second major. To underscore the focus on cultural awareness and to support the achievement of increased linguistic proficiency, our major requires a 10-week minimum experience abroad in a Spanish-speaking country. This experience abroad can be in a formal academic setting, through an internship or other comparable environment. For cases where study abroad is not possible, a student may petition that an internship or other comparable environment. For cases where study abroad is not possible, a student may petition that an internship or other comparable environment be used instead.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<td>Intermediate Spanish I</td>
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<td>SPAN 202</td>
<td>Intermediate Spanish II</td>
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<td>or SPAN 20</td>
<td>or Intermediate Spanish for Heritage Speakers</td>
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<td>SPAN 301</td>
<td>Oral Expression</td>
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<td>SPAN 302</td>
<td>Advanced Grammar</td>
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<td>Advanced Grammar for Heritage Speakers</td>
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<td>SPAN 303</td>
<td>Spanish Composition</td>
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<td>SPAN 306</td>
<td>Business Spanish</td>
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<td>Spanish for the Sciences</td>
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<td>SPAN 350</td>
<td>Spanish Phonetics and Phonology</td>
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<td>SPAN 352</td>
<td>Hispanic Linguistics</td>
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<td>SPAN 452</td>
<td>Hispanic Sociolinguistics</td>
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<td>SPAN 462</td>
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<td>SPAN 311</td>
<td>Hispanic Culture and Civilization to the 18th Century</td>
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<td>SPAN 312</td>
<td>Hispanic Culture and Civilization: 18th Century to Present</td>
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<tr>
<td>SPAN 320</td>
<td>Introduction to Hispanic Literature</td>
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<tr>
<td>SPAN 331</td>
<td>Spanish Literature to 1700</td>
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<td>Spanish Literature from 1700 to 1936</td>
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<td>Spanish-American Literature from 1821 to 1935</td>
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<td>SPAN 410</td>
<td>Hispanic Film</td>
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<td>SPAN 411</td>
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<tr>
<td>SPAN 412</td>
<td>U.S. Hispanic Writers</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 413</td>
<td>Hispanic Culture through Art</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 421</td>
<td>Spanish Language Poetry</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 445</td>
<td>Cervantes</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 450</td>
<td>Contemporary Spanish and Spanish-American Literature</td>
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<td>SPAN 460</td>
<td>Topics in Hispanic Literature</td>
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<td>SPAN 461</td>
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Select nine semester credit hours from the following:  

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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENGL 203</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>3</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>3</td>
</tr>
<tr>
<td>HISP-related courses (see HISP-Related Interdisciplinary Courses table)</td>
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Select one of the following:  

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>HISP courses</td>
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Select three of the following:  

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<tr>
<td>LIT 200</td>
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<td>MATH 222</td>
<td>Mathematics</td>
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<td>SCI 202</td>
<td>Life and physical sciences</td>
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<td>ART 224</td>
<td>Creative arts</td>
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<tr>
<td>SOC 205</td>
<td>Social and behavioral sciences</td>
<td>9</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>9</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>HIS 201</td>
<td>American history</td>
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<tr>
<td>INT 220</td>
<td>International and cultural diversity (p. 40)</td>
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Free Electives  

<table>
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<tr>
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Total Semester Credit Hours  

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1 See department advisor for list of current options.
2 One course must include a corresponding laboratory.
3 Course may also be used to satisfy any other requirement.
4 Additional SPAN hours may not be used as free electives.

33 hours required. Spanish majors are required to complete a credit-bearing 10-week minimum semester-long study or experience abroad in a Spanish-speaking country. Study abroad options include University-sponsored, reciprocal, affiliated, and independent programs. Selection of location and type of experience abroad should be made in consultation with departmental advisors. For students who are unable to study abroad, an internship may be used instead. This option is available only with prior approval by the Spanish advisor.
HISP-Related Interdisciplinary Courses

<table>
<thead>
<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<td>ANTH 308</td>
<td>Archaeology of Mesoamerica</td>
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<tr>
<td>ANTH 445</td>
<td>Studies in African Diaspora</td>
<td>3</td>
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<tr>
<td>ENGL 336</td>
<td>Life and Literature of the Southwest</td>
<td>3</td>
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<tr>
<td>ENGL 338</td>
<td>American Ethnic Literature</td>
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<tr>
<td>HISP 362/ENGL 362</td>
<td>Latino/a Literature</td>
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<tr>
<td>FILM 405/EURO 405</td>
<td>European Cinema</td>
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<td>ENGL 351/FILM 351</td>
<td>Advanced Film</td>
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<tr>
<td>FILM 401</td>
<td>National Cinema History</td>
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<tr>
<td>GEOG 323</td>
<td>Geography of Latin America</td>
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<td>HISP 201</td>
<td>Current Issues in Hispanic Studies</td>
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<td>HISP 204</td>
<td>Spanish and Spanish American Literature in Translation</td>
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<td>HISP 205</td>
<td>Don Quixote and the Other Arts</td>
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<td>HISP 206</td>
<td>Food in the Hispanic World</td>
<td>3</td>
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<tr>
<td>HISP 352</td>
<td>Hispanic Literature and Film</td>
<td>3</td>
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<tr>
<td>HISP 362/ENGL 362</td>
<td>Latino/a Literature</td>
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<tr>
<td>HISP 363</td>
<td>Borderlands: U.S. and Mexico</td>
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<tr>
<td>HISP 474/RELS 474</td>
<td>Diversity Lessons from Medieval</td>
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<td>HIST 304</td>
<td>Mexican-American Frontier to 1848</td>
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<td>HIST 305</td>
<td>Mexican-American History 1848-Present</td>
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<td>HIST 307</td>
<td>Latino Communities of the U.S.</td>
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<tr>
<td>HIST 319</td>
<td>U.S. Immigration and Ethnicity</td>
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<tr>
<td>HIST 321</td>
<td>The Age of Revolution in the Atlantic World</td>
<td>3</td>
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<tr>
<td>HIST 322</td>
<td>History of the Iberian World</td>
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<tr>
<td>HIST 326</td>
<td>History of the Caribbean to Emancipation</td>
<td>3</td>
</tr>
<tr>
<td>HIST 341</td>
<td>Latin America to 1810</td>
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<td>HIST 342</td>
<td>Latin America Since 1810</td>
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<td>HIST 343</td>
<td>Inter-American Relations</td>
<td>3</td>
</tr>
<tr>
<td>HIST 440</td>
<td>Latin American Cultural and Intellectual History</td>
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<tr>
<td>HIST 441</td>
<td>History of Mexico, 1821 to the Present</td>
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<tr>
<td>HIST 449</td>
<td>History of Brazil, 1822 to the Present</td>
<td>3</td>
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<tr>
<td>HLTH 236</td>
<td>Race, Ethnicity and Health</td>
<td>3</td>
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<tr>
<td>IBUS 459</td>
<td>Latin American Markets</td>
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<tr>
<td>INST 332</td>
<td>Second Language Instruction and Assessment</td>
<td>3</td>
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<td>INST 334</td>
<td>Assessment of English Language Learners</td>
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<td>PHIL 283</td>
<td>Latin American Philosophy</td>
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<td>POLS 304</td>
<td>Latino Politics in the United States</td>
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<tr>
<td>POLS 323</td>
<td>Political Systems of Latin America</td>
<td>3</td>
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</tbody>
</table>

Hispanic Studies for Community Engagement - Minor

The minor in Hispanic Studies for Community Engagement offers students the opportunity to combine advanced Spanish language skills and Hispanic cultural knowledge with a service learning experience. This minor is a perfect complement to degrees in other disciplines, since it allows for courses taught in English that address themes from throughout the Hispanic world. Coursework for this minor consists of 18 hours: 6 hours in 300- to 400-level Spanish courses; 9 hours from relevant courses in Anthropology, English, Hispanic Studies, History, Philosophy, Political Science, or Sociology; and 3 hours in the form of a service learning experience with a Hispanic-serving public or private institution. Of the total required hours, at least 9 must be taken in residence at Texas A&M.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>SPAN 301</td>
<td>Oral Expression</td>
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<tr>
<td>SPAN 302</td>
<td>Advanced Grammar</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 303</td>
<td>Spanish Composition</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 304</td>
<td>Advanced Grammar for Heritage Speakers</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 312</td>
<td>Hispanic Culture and Civilization:  18th Century to Present</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 411</td>
<td>Contemporary Hispanic Society and Culture</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 412</td>
<td>U.S. Hispanic Writers</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 460</td>
<td>Topics in Hispanic Literature</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 461</td>
<td>Topics in Hispanic Culture</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 462</td>
<td>Topics in Hispanic Linguistics</td>
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</tr>
<tr>
<td>Electives</td>
<td>Select from the following:</td>
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</table>

Select from the following:

- ANTH 303 Archaeology of the American Southwest
- ANTH 308 Archaeology of Mesoamerica
- ANTH 445 Studies in African Diaspora
- ENGL 336 Life and Literature of the Southwest
- ENGL 338 American Ethnic Literature

Program Requirements
Spanish - Minor

The Spanish minor allows students with other majors to work on their linguistic skills while they gain Hispanic cultural competency. A great way to complement coursework in many other majors, including those in science, health, and business, this minor focuses on language-based coursework that will serve as an asset upon entering the job market after graduation. The minor requires 18 hours of course work beyond 100-level Spanish courses including Spanish 201; 202 or 203. The remaining 12 hours may be selected from the many 300- and 400-level courses offered every semester. Of the total required hours, at least 9 must be taken in residence at Texas A&M.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>SPAN 201</td>
<td>Intermediate Spanish I</td>
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<tr>
<td>SPAN 202</td>
<td>Intermediate Spanish II</td>
<td>3</td>
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<tr>
<td>or SPAN 203</td>
<td>Intermediate Spanish for Heritage Speakers</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 208</td>
<td>Spanish for Health Professionals I</td>
<td></td>
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<tr>
<td>SPAN 218</td>
<td>Spanish for Health Professionals II</td>
<td></td>
</tr>
<tr>
<td>SPAN 221</td>
<td>Field Studies Abroad I</td>
<td></td>
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<tr>
<td>SPAN 222</td>
<td>Field Studies Abroad II</td>
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<td>SPAN 285</td>
<td>Directed Studies</td>
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<td>SPAN 289</td>
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<td>SPAN 306</td>
<td>Business Spanish</td>
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<td>SPAN 307</td>
<td>Spanish for the Sciences</td>
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<td>SPAN 311</td>
<td>Hispanic Culture and Civilization to the 18th Century</td>
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<td>SPAN 318</td>
<td>Oral Communication for Health Professionals</td>
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<td>SPAN 320</td>
<td>Introduction to Hispanic Literature</td>
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<td>SPAN 331</td>
<td>Spanish Literature to 1700</td>
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<td>SPAN 332</td>
<td>Spanish Literature from 1700 to 1936</td>
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<td>SPAN 341</td>
<td>Spanish-American Literature from 1492 to 1821</td>
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<td>SPAN 342</td>
<td>Spanish-American Literature from 1821 to 1935</td>
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<td>SPAN 350</td>
<td>Spanish Phonetics and Phonology</td>
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<td>SPAN 352</td>
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<td>SPAN 403</td>
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<td>SPAN 407</td>
<td>Spanish-English Translation</td>
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<td>SPAN 409</td>
<td>Photography in the Hispanic World</td>
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<td>SPAN 410</td>
<td>Hispanic Film</td>
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<td>SPAN 413</td>
<td>Hispanic Culture through Art</td>
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<td>Advanced Spanish-English Translation</td>
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<td>Spanish Language Poetry</td>
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<td>SPAN 445</td>
<td>Cervantes</td>
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<td>SPAN 450</td>
<td>Contemporary Spanish and Spanish-American Literature</td>
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<td>Hispanic Sociolinguistics</td>
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<td>Capstone</td>
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</table>

Total Semester Credit Hours 18

1. No more than 6 hours from one area and at least 6 hours must be 300-400 level.
2. Any course of relevant content not listed in the electives may be substituted with the advisor’s permission.
3. To be selected in consultation with program coordinator and Academic Advisor during last 6 hours of minor.

Students must make a grade of C or better in minor courses.
At least 9 of these 18 hours must be taken at Texas A&M. A grade of C or higher is required for a course to be counted in the minor field. A minor must be declared before the student has completed 75 credit hours.

**Department of History**

The Department of History at Texas A&M offers the B.A., M.A., and Ph.D. The faculty teach over one hundred undergraduate courses on peoples, ideas, and cultures from around the world and across the ages, and are devoted to developing students' critical thinking, reading, and writing skills. A major in history affords students both a broad education and valuable practical skills. By acquiring familiarity with people in diverse times, places and circumstances, students of history develop a sophisticated human empathy which is the key to good scholarship and good citizenship alike.

Many students rely upon a major in history as preparation for a career in teaching as well as graduate study in law, business, public administration, international relations and theology. A small number pursue graduate degrees in history itself. Other history majors seek postgraduate employment in business management, advertising and public relations, government service, museum and archival work, editorial and publishing work, park interpretation and administration, non-profit organizations, and professions requiring research and bibliographic skills.

**Faculty**

Alonzo, Armando C, Associate Professor  
History  
PHD, Indiana University, 1994

Anderson, Terry H, Professor  
History  
PHD, Indiana University, 1978

Blanton, Carlos K, Professor  
History  
PHD, Rice University, 1999

Bouton, Cynthia A, Professor  
History  
PHD, State University of New York at Binghamton, 1985

Brooks, Charles E, Associate Professor  
History  
PHD, University of Buffalo, 1988

Broussard, Albert S, Professor  
History  
PHD, Duke University, 1977

Cobbs, Elizabeth A, Professor  
History  
PHD, Stanford University, 1988

Collopy, William F, Lecturer  
History  
PHD, Texas A&M University, 2011

Coopersmith, Jonathan, Professor  
History  
PHD, University of Oxford, 1985

Dawson, Joseph G, Professor  
History  
PHD, Louisiana State University, 1978

Dror, Olga, Associate Professor  
History  
PHD, Cornell University, 2003

Emre, Side, Assistant Professor  
History  
PHD, University of Chicago, 2009

Foote, Lorien L, Professor  
History  
PHD, University of Oklahoma, 1999

Haefeli, Evan P, Associate Professor  
History  
PHD, Princeton University, 2000

Hernandez, Sonia, Associate Professor  
History  
PHD, University of Houston, 2006

Hinojosa, Felipe, Associate Professor  
History  
PHD, University of Houston, 2009

Holzweiss, Robert F, Lecturer  
History  
PHD, Texas A&M University, 2001

Hudson, Angela P, Professor  
History  
PHD, Yale University, 2007

Hudson, David R, Instructional Associate Professor  
History  
PHD, Texas A&M University, 1998

Kamphoefner, Walter D, Professor  
History  
PHD, University of Missouri - Columbia, 1978

Kim, Hoi-Eun, Associate Professor  
History  
PHD, Harvard University, 2006

Kirkendall, Andrew J, Professor  
History  
PHD, University of North Carolina at Chapel Hill, 1996

Lenihan, John H, Associate Professor  
History  
PHD, University of Maryland, 1976

Linn, Brian M, Professor  
History  
PHD, The Ohio State University, 1985

Livesay, Harold C, Professor  
History  
PHD, Johns Hopkins University, 1970
Wood, Julia E, Assistant Professor
History
PHD, Yale University, 2011

**Majors**
- Bachelor of Arts in History (p. 516)

**Minors**
- History Minor (p. 517)

**History - BA**

In fulfilling the requirements for a Bachelor of Arts degree in History, students must meet the general degree requirements of the College of Liberal Arts and the special requirements listed in the college section.

**Teacher Certification**

Students wishing to meet certification requirements to teach history or social studies in the secondary schools of Texas should contact the College of Education and Human Development for more complete information about the certification options available at Texas A&M University. To be eligible for these options, students must also consult with, and have approval of, their field advisor in the Department of History.

**Program Requirements**

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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<td>HIST 101</td>
<td>Western Civilization to 1660</td>
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<td>HIST 102</td>
<td>Western Civilization Since 1660</td>
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<td>HIST 105</td>
<td>History of the United States</td>
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<td>HIST 106</td>
<td>History of the United States</td>
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<td>HIST 280</td>
<td>The Historian's Craft</td>
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<td>HIST 481</td>
<td>Seminar in History</td>
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**College and University Requirements**

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<th>Composition and Rhetoric</th>
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<td>ENGL 203</td>
<td>Writing about Literature</td>
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<td>Public Speaking</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<td>COMM 243</td>
<td>Argumentation and Debate</td>
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<tr>
<td>Literature in English (p. 465)</td>
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<td>Foreign language (p. 465)</td>
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<tr>
<td>PHIL 341</td>
<td>Symbolic Logic</td>
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</tr>
<tr>
<td>PHIL 342</td>
<td>Symbolic Logic II</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>9</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
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</table>
Creative arts (p. 24) 3
Language, philosophy and culture or creative arts 3
(p. 23)
Social and behavioral science (p. 25) 6
POLS 206 American National Government 3
POLS 207 State and Local Government 3
International and cultural diversity (p. 40) 3
General electives (including minor) 4
Total Semester Credit Hours 25

1 Writing-intensive course.
2 At least 12 hours at the 300- and 400-level. At least 3 hours of pre-modern history and at least 3 hours from three of the five lists (United States; Europe; Latin America and Caribbean; Africa, Asia and the Middle East; Thematic).
3 Course may also be used to satisfy other requirements.
4 Students may use an additional 12 hours of HIST 300-499 for this requirement.

Students should plan a program of study in consultation with one of the department's undergraduate advisors.

A minimum of 33 hours in history may be applied to the degree. Students must take not less than 15 credit hours at upper level for history residency requirement. A grade of C or higher is required for a course to be counted in the major field. A student must complete not less than 18 hours of coursework in history at Texas A&M University.

**Minor Field of Study**

All history majors are encouraged to select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors or career opportunity minors). The minor will consist of a minimum of 15 hours of coursework, as defined by the minor department. A grade of C or higher is required for a course to be counted in the minor field. Interdisciplinary minors (p. 472) such as Women's and Gender Studies, Africana Studies, Classical Studies, Religious Studies, Film Studies, Latina/o and Mexican American Studies, and Business have specific requirements; students should consult undergraduate advisors in these areas of study. A second major may substitute for the minor. Courses used to meet the minor requirements may not be used in the major. See also the statement on “Minor Field of Study” under the general requirements (p. 465) of the College of Liberal Arts.

**History - Minor**

To apply for a history minor, a student needs to consult with one of the undergraduate advisors in the Department of History.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
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<td>Upper-level requirement</td>
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</table>

Total Semester Credit Hours 15

Students must make a grade of “C” or better in all courses.

**Department of International Studies**

The Department of International Studies offers diverse curricula that immerse students in the social, political, economic, and cultural implications of globalization. The degree combines a linguistic and cultural proficiency with a flexible set of tracks and a mandatory abroad experience. In addition to the BA in International Studies, the department offers Modern Language BA degree options in French, German, and Russian, as well as a BA in Classics. Students looking for language minors can find them in Arabic, Chinese, Classical Studies, French, German, Italian, Japanese, and Russian. We also offer minors in Asian Studies and Comparative Cultural Studies. The programs give students a combination of measurable language proficiency and a global perspective that will serve both their professional and personal ambitions.

**Required Foreign Language Placement Test.** Incoming students who intend to enroll for the first time in any language course at Texas A&M University, who have previous knowledge, however acquired, of the language in which they plan to enroll, and who have no college credit in the language, must take the departmental placement examination to determine the appropriate course for their level of ability. The placement test also serves as a basis for credit by examination. The placement examination will be administered by the Department of International Studies during freshman conferences along with other credit by exam tests. The test will also be offered during Fall and Spring semesters. Students who take the Advanced Placement (AP) test or other acceptable tests which grant college-level credit in their foreign language of choice do not have to take the required departmental placement test. In this case, the AP and Achievement test results may be used for placement.

**International students whose native language is not English** are exempted from satisfying the University foreign language requirement. These students are not allowed to register in those courses in their native language that are used to fulfill that requirement.

**Faculty**

Adams, George C, Senior Lecturer
International Studies Department
MA, Temple University, 1995

Arfaoui, Turkia, Lecturer
International Studies Department
MED, Texas A&M University, 2012

Ayari, Salah, Instructional Associate Professor
International Studies Department
PHD, University of Minnesota, Twin Cities, 1998

Bouxein, Hilary J, Lecturer
International Studies Department
PHD, University of Virginia, 2016

Bracher, Nathan J, Professor
International Studies Department
PHD, The University of Texas at Austin, 1984
Brenner, David A, Lecturer
International Studies Department
PHD, The University of Texas at Austin, 1993

Carley, Robert F, Assistant Professor
International Studies Department
PHD, Texas A&M University, 2012

Cecchini, Fabiana, Instructional Assistant Professor
International Studies Department
PHD, University of Pennsylvania, 2007

Cerrato, Maddalena A, Lecturer
International Studies Department
PHD, Italian Institute for Human Sciences, 2013

Charlot, Jean-Baptiste, Lecturer
International Studies Department
MA, Texas A&M University, 2015

Ciccolella, Federica, Professor
International Studies Department
PHD, Columbia University, 2004

Cooke, Leighton B, Professor
International Studies Department
PHD, University of California, Berkeley, 1983

Cooke, Olga M, Associate Professor
International Studies Department
PHD, University of London, 1982

Golsan, Ines D, Senior Lecturer
International Studies Department
PHD, University of North Carolina at Chapel Hill, 1977

Golsan, Richard J, Distinguished Professor
International Studies Department
PHD, University of North Carolina at Chapel Hill, 1981

Hannaford, Dinah R, Assistant Professor
International Studies Department
PHD, Emory University, 2014

Harris, Stefanie, Associate Professor
International Studies Department
PHD, Emory University, 1999

Hawthorne, Melanie C, Professor
International Studies Department
PHD, University of Michigan, 1987

Hernandez Chautagnat, Viviana P, Lecturer
International Studies Department
MA, University of California, Los Angeles, 1992

Karapisahi, Sena, Instructional Assistant Professor
International Studies Department
PHD, Universiteit Leiden, 2006

Khazaal, Natalie M, Assistant Professor
International Studies Department
PHD, University of California, Los Angeles, 2007

Konrad, Christoph F, Associate Professor
International Studies Department
PHD, University of North Carolina at Chapel Hill, 1985

Lake, Justin, Associate Professor
International Studies Department
PHD, Harvard University, 2008

Larson, Ruth E, Associate Professor
International Studies Department
PHD, Yale University, 1991

Lei, Jun, Assistant Professor
International Studies Department
PHD, University of California, San Diego, 2015

Marchesini, Manuela, Associate Professor
International Studies Department
PHD, Stanford University, 2000

O’Hearn, Bilge, Assistant Professor
International Studies Department
PHD, State University of New York at Binghamton, 2011

Oberhelman, Steven M, Professor
International Studies Department
PHD, University of Minnesota, Twin Cities, 1981

Passmore, Ashley A, Assistant Professor
International Studies Department
PHD, University of Chicago, 2007

Ragucci, Sylvie B, Senior Lecturer
International Studies Department
PHD, The Pennsylvania State University, 1999

Rich, Elisabeth, Associate Professor
International Studies Department
PHD, University of Michigan, 1985

Rosenthal, Adam R, Instructional Assistant Professor
International Studies Department
PHD, Emory University, 2014

Shandley, Robert R, Professor
International Studies Department
PHD, University of Minnesota, Twin Cities, 1996

Shi, Wei Dong, Senior Lecturer
International Studies Department
PHD, Beijing Normal University, 1999

Siefert, Thomas R, Instructional Assistant Professor
International Studies Department
PHD, Harvard University, 2013

Vionnet-Bracher, Francoise M, Instructional Associate Professor
International Studies Department
PHD, The University of Texas at Austin, 1989

Waugh, Yuki, Instructional Assistant Professor
International Studies Department
PHD, University of Nebraska, 2006
Majors
- Bachelor of Arts in Classics, Classical Civilization Track (p. 519)
- Bachelor of Arts in Classics, Language and Literature Track (p. 520)
- Bachelor of Arts in International Studies, Global Cultural Studies Track (p. 520)
- Bachelor of Arts in International Studies, International Commerce Track (p. 522)
- Bachelor of Arts in International Studies, International Communication and Media Track (p. 524)
- Bachelor of Arts in International Studies, International Environmental Studies Track (p. 525)
- Bachelor of Arts in International Studies, International Geography Information Systems Track (p. 527)
- Bachelor of Arts in International Studies, International Politics and Diplomacy Track (p. 529)
- Bachelor of Arts in International Studies and Master of International Affairs, 5-Year Degree Program (p. 530)
- Bachelor of Arts in Modern Languages, French Option (p. 532)
- Bachelor of Arts in Modern Languages, German Option (p. 533)
- Bachelor of Arts in Modern Language, Russian Option (p. 534)

Minors
- Arabic Studies Minor (p. 535)
- Asian Studies Minor (p. 535)
- Chinese Minor (p. 536)
- Classical Studies Minor (p. 536)
- French Minor (p. 537)
- German Minor (p. 537)
- Italian Minor (p. 537)
- Japanese Minor (p. 538)
- Russian Minor (p. 538)

Classics - BA, Classical Civilization Track

The B.A. in Classics is designed to give students a thorough grounding in the culture, history, literature, and intellectual accomplishments of Ancient Greece and Rome from the Bronze Age to the dawn of the Middle Ages. Studying the history and literature of these civilizations will not only help students to develop skills in close reading, writing, and critical thinking, but will also help them to see how fundamental concepts of Western Civilization such as rationalism and democracy first arose in Classical Antiquity. The Classics degree is divided into two tracks: the literature and language track has a traditional focus on Latin and Greek philology (students choose either Latin or Greek to specialize in, but are encouraged to take both) and is intended to enable students to read and enjoy the great texts of Classical Antiquity (Homer, Herodotus, Thucydides, Livy, Tacitus, the New Testament, etc.) in the original languages. The Classical Civilization track has no language requirement and focuses instead on the history, beliefs, and material culture of ancient Greek and Roman civilization. A major in Classics signals a commitment to serious intellectual inquiry and is an excellent basis for careers in law, business, consulting, public service, and teaching. Those intending to pursue careers in medicine or finance will also find that a major in Classics can be easily combined with undergraduate courses required for those fields.

Program Requirements

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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<td>Foundational Courses</td>
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<td>CLAS 491</td>
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<td>ANTH 317/RELS 317</td>
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<tr>
<td>CLAS 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<td>CLAS 250 to 499</td>
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<td>PHIL 410</td>
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<td>ARCH 430</td>
<td>History of Ancient Architecture</td>
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<td>ARCH 434</td>
<td>The Role of Sculpture and Painting in Ancient Architecture</td>
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<td>CLAS 250 to 499</td>
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<td>Foreign language (p. 465)</td>
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<td>Creative arts (p. 24)</td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
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<td>Social and behavioral sciences (p. 25)</td>
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<td>American history (p. 25)</td>
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<td>American National Government</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>International and cultural diversity (p. 40)</td>
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<td>General electives 3</td>
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<td>Total Semester Credit Hours</td>
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</table>

1 At least 3 hours must be in MATH. Three hours may be PHIL 240.
2 Courses may be used to satisfy other requirements.
3 Select from any 100-499 courses not used elsewhere, except CLAS 300-499.
Minor Field of Study. All Classics majors are strongly encouraged to select 15-18 hours in a minor field of study. Students must earn a "C" or better in all minor coursework.

Courses cross-listed with other programs cannot be used under different prefixes to fulfill more than one requirement.

Classics - BA, Language and Literature Track

The B.A. in Classics is designed to give students a thorough grounding in the culture, history, literature, and intellectual accomplishments of Ancient Greece and Rome from the Bronze Age to the dawn of the Middle Ages. Studying the history and literature of these civilizations will not only help students to develop skills in close reading, writing, and critical thinking, but will also help them to see how fundamental concepts of Western Civilization such as rationalism and democracy first arose in Classical Antiquity. The Classics degree is divided into two tracks: the Literature and Language track has a traditional focus on Latin and Greek philology (students choose either Latin or Greek to specialize in, but are encouraged to take both) and is intended to enable students to read and enjoy the great texts of Classical Antiquity (Homer, Herodotus, Thucydides, Livy, Tacitus, the New Testament, etc.) in the original languages. The Classical Civilization track has no language requirement and focuses instead on the history, beliefs, and material culture of ancient Greek and Roman civilization. A major in Classics signals a commitment to serious intellectual enquiry and is an excellent basis for careers in law, business, consulting, public service, and teaching. Those intending to pursue careers in medicine or finance will also find that a major in Classics can be easily combined with undergraduate courses required for those fields.

Program Requirements

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<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
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<td><strong>Greek or Latin Language</strong></td>
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<td>Beginning Classical Greek II</td>
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<td>Intermediate Greek</td>
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<td>CLAS 312</td>
<td>Advanced Classical Greek Poetry</td>
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<td>CLAS 310 to 319 (p. 759)</td>
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<td><strong>Latin</strong></td>
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<td>CLAS 122</td>
<td>Beginning Latin II</td>
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<td>CLAS 221</td>
<td>Intermediate Latin I</td>
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<td>CLAS 222</td>
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<td>CLAS 320 to 329 (p. 759)</td>
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<td>ANTH 316</td>
<td>Nautical Archaeology</td>
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<td>ANTH 317/</td>
<td>Introduction to Biblical Archaeology</td>
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College, University Requirements

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<td>Language, philosophy and culture (p. 23)</td>
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<td>American National Government</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>International and cultural diversity (p. 40)</td>
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1. At least 3 hours must be in MATH. Three hours may be PHIL 240.
2. Courses may be used to satisfy other requirements.
3. Select from any 100-499 courses not used elsewhere, except CLAS 300-499.

Minor Field of Study. All Classics majors are strongly encouraged to select 15-18 hours in a minor field of study. Students must earn a "C" or better in all minor coursework.

Courses cross-listed with other programs cannot be used under different prefixes to fulfill more than one requirement.

International Studies - BA, Global Cultural Studies Track

Principle objectives

1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

**Curriculum**

The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student's foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

**Global Cultural Studies Track**

The Global Cultural Studies track offers students both the fundamental theoretical background in cultural studies as well as a broad array of courses in international cultural production and criticism. This humanities based program provides students with a rich understanding of artistic expression in a global setting.

**Program Requirements**

<table>
<thead>
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<th>Code</th>
<th>Title</th>
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<td>Introduction to International Studies</td>
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<td>INTS 205</td>
<td>Current Issues in International Studies</td>
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<td>INTS 400 to 480</td>
<td>(p. 852)</td>
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<td>INTS 485</td>
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<td>INTS 497</td>
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<td>INTS 481</td>
<td>Senior Seminar in International Studies</td>
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<td>INTS 211/</td>
<td>Foundations in Cultural Studies</td>
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<td>ENGL 211</td>
<td>World Literature</td>
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<td>MUSC 324</td>
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<td>ANTH 335/</td>
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<td>ASIA 335</td>
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<td>ANTH 340/</td>
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<td>ANTH 424</td>
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<td>ANTH 440</td>
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<td>ARCH 430</td>
<td>History of Ancient Architecture</td>
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<td>ARCH 434</td>
<td>The Role of Sculpture and Painting in Ancient Architecture</td>
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<td>CLAS 415/</td>
<td>The Ancient World in Film</td>
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<td>CLAS 418</td>
<td>European Intellectual History from Ancient Greece to the Early Middle Ages</td>
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<tr>
<td>COMM 335</td>
<td>Intercultural Communication</td>
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<td>COMM 340</td>
<td>Communication and Popular Culture</td>
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<tr>
<td>COMM 365/International Communication</td>
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<tr>
<td>JOUR 365</td>
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<tr>
<td>EURO 300 to 489</td>
<td>(p. 809)</td>
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<td>GEOG 311</td>
<td>Cultural Geography</td>
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<td>HIST 421</td>
<td>European Intellectual History in the Twentieth Century</td>
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<td>INTS 301</td>
<td>Theories of Globalization</td>
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<td>INTS 484</td>
<td>Directed Internship</td>
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<tr>
<td>MUSC 324/</td>
<td>Music in World Cultures</td>
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<td>MUSC 325/</td>
<td>Dance and World Cultures</td>
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<td>Performance in World Cultures</td>
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<td>Philosophy of Art</td>
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<td>Philosophy of Religion</td>
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<th>Code</th>
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<tr>
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<tr>
<td>Europe</td>
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<td>Africa</td>
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<tr>
<td>North Africa and the Middle East</td>
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<td>Asia</td>
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<td>Foreign Language</td>
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<td>International Experience Requirement</td>
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<td>ENGL 104</td>
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<td>Select one of the following:</td>
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<td>ENGL 203</td>
<td>Writing about Literature</td>
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<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<td>COMM 203</td>
<td>Public Speaking</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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</table>
International Studies - BA, International Commerce Track

Principle objectives
1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

Curriculum
The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

International Commerce Track
The International Commerce track combines a basic set of courses in business practice with a broader set of courses in international economic and social theory. Student choose their coursework from a list that spans at least four colleges of the university. It provides students with a well-developed understanding of the interconnectedness of global commercial systems.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Core Courses</td>
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<tr>
<td>INTS 201</td>
<td>Introduction to International Studies</td>
<td>3</td>
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</tbody>
</table>

Take three hours of the following:

- Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
- Selected Texas A&M University Study Abroad programs which involve intensive cultural and language immersion.
- A combination of the above to equal the requirement of a long semester or a 10-week summer-approved experience.
- Must be taken outside of the student's country of origin.
- Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

Other courses may qualify for the college, university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or in the International Studies Degree Program Office. The list incorporates University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the International and Cultural Diversity Graduation requirement.

Foreign Language
Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.

- Students placed in 101 will take 101, 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 102 will take 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 201 will take 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 202 will take 202 and 6 semester credit hours at the 300- or 400-level.
- Students placing out of 101, 102, 201 and 202 will take 6 semester credit hours at the 300- or 400-level.

International Experience Requirements
The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. Any international experience that does not meet these criteria will not count toward the degree.

- Must be at least one long semester or one 10-week summer approved experience.
- Must be taken after completion of 100- and 200-level language requirement and INTS 201.
- Must be completed before student is eligible to enroll in INTS 481, INTS 491 or INTS 497.
- Must be an immersion experience in the foreign culture and language, which can be satisfied by:
  - An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Literature in English (p. 465)</td>
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<td></td>
<td>Mathematics (p. 885)</td>
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<td></td>
<td>Language, philosophy and culture (p. 23)</td>
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<td></td>
<td>Creative arts (p. 24)</td>
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<td></td>
<td>Life and physical sciences (p. 22)</td>
<td>9</td>
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<tr>
<td></td>
<td>Social and behavioral sciences (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
<td>6</td>
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<td></td>
<td>POLS 206 American National Government</td>
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<td></td>
<td>POLS 207 State and Local Government</td>
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<tr>
<td></td>
<td>International and cultural diversity (p. 40)</td>
<td>5</td>
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<tr>
<td></td>
<td>General Electives</td>
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</table>

Total Semester Credit Hours 120

1. Choose courses from an approved list on the INTS website in consultation with an advisor. Courses numbered 485 or 489 that contain significant international content can be taken in any department to meet part of the track or area requirement. Students must obtain International Studies advisor approval before taking the 485 or 489 course.
2. See the Foreign Language paragraph.
3. See the International Experience Requirements paragraph.
4. At least 3 hours must be in MATH. Three hours may be PHIL 240.
5. Courses may be used to satisfy other requirements.
INTS 205 Current Issues in International Studies (1 hour course to be taken 3 times)

Select two of the following:

- INTS 400 to 480 (p. 852)
- INTS 485 Directed Studies (no more than 3 hours)
- INTS 489 Special Topics in...
- INTS 497 Independent Honors Study
- INTS 481 Senior Seminar in International Studies

Track Courses

Select three of the following:

- ACCT 209 Survey of Accounting Principles
- AGEC 105 Introduction to Agricultural Economics
- ECON 203 Principles of Economics
- FINC 409 Survey of Finance Principles
- ISTM 209 Business Information Systems Concepts
- MGMT 209 Business, Government and Society
- MGMT 309 Survey of Management
- MKTG 409 Principles of Marketing

Select three of the following:

- AGEC 452 International Trade and Agriculture
- ECON 320 Economic Development of Europe
- ECON 324 Comparative Economic Systems
- ECON 330 Economic Development
- ECON 425 The Organization of Industry
- ECON 452 International Trade Theory and Policy
- GEOG 304 Economic Geography
- INTS 301 Theories of Globalization
- INTS 484 Directed Internship
- SOCI 206 Global Social Trends
- SOCI 325/ASIA 325 International Business Behavior
- SOCI 328 Environmental Sociology
- SOCI 423 Globalization and Social Change

Area Studies

Select courses from one of the following areas:

- Latin America
- Europe
- Africa
- North Africa and the Middle East
- Asia
- Foreign Language

International Experience Requirement

Foreign Language

Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.

- Students placed in 101 will take 101, 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 102 will take 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 201 will take 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 202 will take 202 and 6 semester credit hours at the 300- or 400-level.
- Students placing out of 101, 102, 201 and 202 will take 6 semester credit hours at the 300- or 400-level.

International Experience Requirements

The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. Any international experience that does not meet these criteria will not count toward the degree.

- Must be at least one long semester or one 10-week summer approved experience.
- Must be taken after completion of 100- and 200-level language requirement and INTS 201.
- Must be completed before student is eligible to enroll in INTS 481, INTS 491 or INTS 497.
• Must be an immersion experience in the foreign culture and language, which can be satisfied by:
  • An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.
  • Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
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• Must be taken outside of the student’s country of origin.
• Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

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International Studies - BA, International Communication and Media Track

The BA in International Studies is a degree offered in the Department of International Studies.

Principle objectives

1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

Curriculum

The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

International Communication and Media Track

As one of the largest sectors of the American and global economy, communication and media occupy a major role in our private and professional lives. Moreover, this sector of the economy often functions transnationally in a relatively seamless fashion. This track offers a discreet set of courses that provide students with a strong background in how media function in a global setting.

Program Requirements

<table>
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<tr>
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<th>Title</th>
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</thead>
<tbody>
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<td>INTS 201</td>
<td>Introduction to International Studies</td>
<td>3</td>
</tr>
<tr>
<td>Take three hours of the following:</td>
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<tr>
<td>INTS 205</td>
<td>Current Issues in International Studies</td>
<td>3</td>
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<tr>
<td>Select two of the following:</td>
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<tr>
<td>INTS 400 to 480 (p. 852)</td>
<td>6</td>
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<tr>
<td>INTS 485</td>
<td>Directed Studies</td>
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<tr>
<td>INTS 489</td>
<td>Special Topics in...</td>
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<tr>
<td>INTS 497</td>
<td>Independent Honors Study</td>
<td>3</td>
</tr>
<tr>
<td>INTS 481</td>
<td>Senior Seminar in International Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Track courses

Select three of the following: 9

- COMM 240 Rhetorical Criticism
- COMM 243 Argumentation and Debate
- COMM 320 Organizational Communication
- COMM 325 Persuasion
- COMM 415 New Media and Civil Society
- COMM 443 Communication and Conflict
- COMM 446 Communication, Organizations and Society
- ENGL 241 Advanced Composition
- ENGL 320 Technical and Professional Editing
- JOUR 203 Media Writing I
- JOUR 303 Media Writing II
- MKTG 409 Principles of Marketing
- PSYC 346 Psychology of Language

Select three of the following: 9

- COMM 330 Technology and Human Communication
- COMM 335 Intercultural Communication
- COMM 340 Communication and Popular Culture
- COMM 354 Political Economy of Telecommunication
- COMM 365/International Communication
- JOUR 365
- COMM 450 Media Campaigns
- COMM 454 Telecommunication Policy
- COMM 458/Global Media
- JOUR 458
- INTS 301 Theories of Globalization
- INTS 484 Directed Internship

Area Studies

Select courses from one of the following areas: 9

- Latin America
Foreign Language

Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.

- Students placed in 101 will take 101, 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
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International Experience Requirements

The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. 

*Any international experience that does not meet these criteria will not count toward the degree.*

- Must be at least one long semester or one 10-week summer approved experience.
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- Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

Other courses may qualify for the college, university requirements and the degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

International Studies - BA, Environmental Studies Track

Principle objectives

1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

Curriculum

The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

International Environmental Studies Track

Globalization and rapid industrialization have brought about a set of environmental concerns that defy national boundaries. Students will work...
International Studies - BA, Environmental Studies Track

through a fascinating array of coursework chosen among the Colleges of Geoscience, Science, AgriLife, and Liberal Arts. Ultimately students will have a firm grasp of the myriad environmental issues that arise from our global interconnectedness.

### Program Requirements

<table>
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<td>3</td>
</tr>
<tr>
<td>Take three hours of the following:</td>
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<td>INTS 205</td>
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<td>INTS 481</td>
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<td><strong>Track Courses</strong></td>
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<td>AGEC 350</td>
<td>Environmental and Natural Resource Economics</td>
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<td>AGEC 414</td>
<td>Agribusiness and Food Market Analysis</td>
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<td>AGEC 452</td>
<td>International Trade and Agriculture</td>
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<td>AGLS 101</td>
<td>Modern Agricultural Systems and Renewable Natural Resources</td>
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<td>ATMO 201</td>
<td>Weather and Climate</td>
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<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
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<td>Plants and People</td>
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<td>BIOL 357</td>
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<td>FSTC 201</td>
<td>Food Science</td>
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<td>GEOG 201</td>
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<td>GEOG 202</td>
<td>Geography of the Global Village</td>
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<td>GEOG 203</td>
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<td>Global Change</td>
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<td>OCNG 251</td>
<td>Oceanography</td>
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<td>Politics of Energy and the Environment</td>
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<td>Environmental Political Theory</td>
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<td>Fundamentals of Ecology</td>
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<td>Africa</td>
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<td>North Africa and the Middle East</td>
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<td><strong>College and University Requirements</strong></td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>Select one of the following:</td>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>6</td>
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<tr>
<td>Literature in English (p. 465)</td>
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<td>Mathematics (p. 22)</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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<td>Creative arts (p. 24)</td>
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<td>Life and physical sciences (p. 22)</td>
<td>9</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>6</td>
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<td>American history (p. 25)</td>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>International and cultural diversity (p. 40)</td>
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<tr>
<td>General electives</td>
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</table>

Total Semester Credit Hours 120

1. Choose courses from an approved list on the INTS website in consultation with an advisor. Courses numbered 485 or 489 that contain significant international content can be taken in any department to meet part of the track or area requirement. Students must obtain International Studies advisor approval before taking the 485 or 489 course.
2. See the Foreign Language paragraph.
3. See the International Experience Requirements paragraph.
4. At least 3 hours must be in MATH. Three hours may be PHIL 240.
5. Courses may be used to satisfy other requirements.
Foreign Language
Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.

- Students placed in 101 will take 101, 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 102 will take 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 201 will take 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 202 will take 202 and 6 semester credit hours at the 300- or 400-level.
- Students placing out of 101, 102, 201 and 202 will take 6 semester credit hours at the 300- or 400-level.

International Experience Requirements
The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. Any international experience that does not meet these criteria will not count toward the degree.

- Must be at least one long semester or one 10-week summer approved experience.
- Must be taken after completion of 100- and 200-level language requirement and INTS 201.
- Must be completed before student is eligible to enroll in INTS 481, INTS 491 or INTS 497.
- Must be an immersion experience in the foreign culture and language, which can be satisfied by:
  - An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.
  - Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
  - Selected Texas A&M University Study Abroad programs which involve intensive cultural and language immersion.
  - A combination of the above to equal the requirement of a long semester or a 10-week summer-approved experience.
- Must be taken outside of the student’s country of origin.
- Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

Other courses may qualify for the college, university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or in the International Studies Degree Program Office. The list incorporates University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the International and Cultural Diversity Graduation requirement.

International Studies - BA, International Geographic Information Systems Track

Principle objectives
1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

Curriculum
The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

International Geographic Information Systems Track
The International Geographic Information Systems track adds a tremendous skill set to the already substantial ones offered by the core INTS major. The International GIS track immerses students in the workings of spatially distributed information that is used in the environmental, transportation, defense, and many other sectors of the economy. Students will develop skills in spatial analysis and advanced applications of GIS technologies.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>INTS 201</td>
<td>Introduction to International Studies</td>
<td>3</td>
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<tr>
<td>INTS 205</td>
<td>Current Issues in International Studies (1 hour course to be taken 3 times)</td>
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<td>INTS 400 to 480 (p. 852)</td>
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<tr>
<td>INTS 485</td>
<td>Directed Studies (no more than 3 hours)</td>
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<tr>
<td>INTS 489</td>
<td>Special Topics in...</td>
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<td>INTS 497</td>
<td>Independent Honors Study</td>
<td>3</td>
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<td>INTS 481</td>
<td>Senior Seminar in International Studies</td>
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Track Courses
Select one of the following: 3

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<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
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<tr>
<td>GEOG 203</td>
<td>Planet Earth</td>
</tr>
<tr>
<td>GEOG 205</td>
<td>Environmental Change</td>
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</table>
GEOL 101 Principles of Geology
GEOS 210 Climate Change
OCNG 251 Oceanography
Select one of the following: 3
GEOG 320 The Middle East
GEOG 323 Geography of Latin America
GEOG 324 Global Climatic Regions
GEOG 325 Geography of Europe
GEOG 327 Geography of South Asia
GEOG 361 Remote Sensing in Geosciences 4
GEOG 390 Principles of Geographic Information Systems 4
GEOG 475 Advanced Topics in GIS (Geographic Information Systems) 4

Area Studies
Select courses from one of the following areas: 1 9
- Latin America
- Europe
- Africa
- North Africa and the Middle East
- Asia
Foreign Language 2 20
International Experience Requirement 3

College and University Requirements
ENGL 104 Composition and Rhetoric 3
Select one of the following: 3
- ENGL 203 Writing about Literature
- ENGL 210 Technical and Business Writing
- COMM 203 Public Speaking
- COMM 205 Communication for Technical Professions
COMM 243 Argumentation and Debate
Literature in English (p. 465) 6
Mathematics (p. 22) 4 6
Language, philosophy and culture (p. 23) 3
Creative arts (p. 24) 3
Life and physical sciences (p. 22) 9
Social and behavioral sciences (p. 25) 6
American history (p. 25) 6
POLS 206 American National Government 3
POLS 207 State and Local Government 3
International and cultural diversity (p. 40) 5
General electives 7

Total Semester Credit Hours 120

1 Choose courses from an approved list on the INTS website in consultation with an advisor. Courses numbered 485 or 489 that contain significant international content can be taken in any department to meet part of the track or area requirement. Students must obtain International Studies advisor approval before taking the 485 or 489 course.
2 See the Foreign Language paragraph.
3 See the International Experience Requirements paragraph.
4 At least 3 hours must be in MATH. Three hours may be PHIL 240.

Courses may be used to satisfy other requirements.

Foreign Language
Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.
- Students placed in 101 will take 101, 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 102 will take 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 201 will take 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 202 will take 202 and 6 semester credit hours at the 300- or 400-level.
- Students placing out of 101, 102, 201 and 202 will take 6 semester credit hours at the 300- or 400-level.

International Experience Requirements
The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. Any international experience that does not meet these criteria will not count toward the degree.
- Must be at least one long semester or one 10-week summer approved experience.
- Must be taken after completion of 100- and 200-level language requirement and INTS 201.
- Must be completed before student is eligible to enroll in INTS 481, INTS 491 or INTS 497.
- Must be an immersion experience in the foreign culture and language, which can be satisfied by:
  - An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.
  - Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
  - Selected Texas A&M University Study Abroad programs which involve intensive cultural and language immersion.
  - A combination of the above to equal the requirement of a long semester or a 10-week summer-approved experience.
- Must be taken outside of the student’s country of origin.
- Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

Other courses may qualify for the college, university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or in the International Studies Degree Program Office. The list incorporates University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the International and Cultural Diversity Graduation requirement.
International Studies - BA, International Politics and Diplomacy Track

Principle objectives
1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

Curriculum
The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

International Politics and Diplomacy Track
This track offers students a fundamental understanding of foreign relations. Students learn about the workings of governments and civil societies in a global framework. In the end, students come away from the program with a sound understanding of how governments communicate and cooperate in regional, continental, and global settings.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tr>
<td>INTS 201</td>
<td>Introduction to International Studies</td>
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<td></td>
<td>Take three hours of the following:</td>
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<tr>
<td>INTS 205</td>
<td>Current Issues in International Studies</td>
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<td>Select two of the following:</td>
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<td>INTS 400 to 480</td>
<td>(p. 852)</td>
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<td>INTS 485</td>
<td>Directed Studies</td>
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<td>INTS 489</td>
<td>Special Topics in...</td>
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<td>INTS 497</td>
<td>Independent Honors Study</td>
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<tr>
<td>INTS 481</td>
<td>Senior Seminar in International Studies</td>
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| Track Courses |
| Select six of the following from at least two departments: 18 |
| ECON 203 Principles of Economics |
| ECON 320 Economic Development of Europe |
| ECON 324 Comparative Economic Systems |
| ECON 330 Economic Development |

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<td>ECON 452</td>
<td>International Trade Theory and Policy</td>
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<td>HIST 343</td>
<td>Inter-American Relations</td>
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<td>International Developments Since 1918</td>
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<td>INTS 301</td>
<td>Theories of Globalization</td>
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<td>INTS 484</td>
<td>Directed Internship</td>
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<td>POLS 229</td>
<td>Introduction to Comparative Politics</td>
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<td>POLS 231</td>
<td>Introduction to World Politics</td>
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<td>POLS 324</td>
<td>Politics of Global Inequality</td>
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<td>POLS 328</td>
<td>Globalization and Democracy</td>
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<td>POLS 347</td>
<td>Politics of Energy and the Environment</td>
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<td>POLS 350</td>
<td>Modern Political Thought</td>
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<td>POLS 358</td>
<td>Comparative Judicial Politics</td>
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<td>POLS 364</td>
<td>Global Political Thought</td>
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<td>POLS 413</td>
<td>American Foreign Policy</td>
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<td>POLS 415</td>
<td>Contemporary Issues in American Foreign Policy</td>
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<td>POLS 423</td>
<td>U.S.-Latin American Relations</td>
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<td>POLS 424</td>
<td>Comparative Governmental Institutions</td>
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<td>POLS 429</td>
<td>Issues in World Politics</td>
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<td>POLS 432</td>
<td>The Politics of European Union</td>
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<td>POLS 447</td>
<td>National Security Policy</td>
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<td>POLS 454</td>
<td>Contemporary Political Ideas</td>
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<td>POLS 456</td>
<td>Environmental Political Theory</td>
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<td>POLS 475</td>
<td>Government and the Economy</td>
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<td>SOCI 325/</td>
<td>International Business Behavior</td>
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<td>ASIA 325</td>
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<td>SOCI 423</td>
<td>Globalization and Social Change</td>
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Area Studies
Select courses from one of the following areas: 1 9
Latin America
Europe
Africa
North Africa and the Middle East
Asia

Foreign Language
Courses and/or replacement credits 2 20

International Experience Requirement
Experience requires Director of International Studies approval before travel 3

College, University Requirements
ENGL 104 Composition and Rhetoric 3
Select one of the following: 3
ENGL 203 Writing about Literature
ENGL 210 Technical and Business Writing
COMM 203 Public Speaking
Any international experience that does not meet these criteria will not earn Texas A&M University credit. Departmental approval is required before travel.

### Foreign Language

Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.

1. Students placed in 101 will take 101, 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
2. Students placed in 102 will take 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
3. Students placed in 201 will take 201 and 202 and 6 semester credit hours at the 300- or 400-level.
4. Students placed in 202 will take 202 and 6 semester credit hours at the 300- or 400-level.
5. Students placing out of 101, 102, 201 and 202 will take 6 semester credit hours at the 300- or 400-level.

### International Experience Requirements

The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. Any international experience that does not meet these criteria will not count toward the degree.

- Must be at least one long semester or one 10-week summer approved experience.
- Must be taken after completion of 100- and 200-level language requirement and INTS 201.
- Must be completed before student is eligible to enroll in INTS 481, INTS 491 or INTS 497.
- Must be an immersion experience in the foreign culture and language, which can be satisfied by:
  - An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.
  - Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
  - Selected Texas A&M University Study Abroad programs which involve intensive cultural and language immersion.
  - A combination of the above to equal the requirement of a long semester or a 10-week summer-approved experience.
- Must be taken outside of the student’s country of origin.
- Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

Other courses may qualify for the college, university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or in the International Studies Degree Program Office. The list incorporates University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the International and Cultural Diversity Graduation requirement.

### International Studies - 5-Year Bachelor of Arts and Master of International Affairs

#### Principle objectives

1. To guide students through the complex cultural, social, political, and economic stakes of global interdependence.
2. To assure a measurable proficiency in a foreign language.
3. To assure regional cultural competency through a structured and integrated abroad experience.
4. To provide a historical dimension to current conceptions of globalization.

#### Curriculum

The degree plan consists of a combination of INTS core courses (15 hours), with electives tailored for each track (18 hours); area studies courses in the region corresponding to the student’s foreign language choice (9 hours); foreign language courses (20 hours); and at least one long semester or 10-week summer study abroad or other approved international program with an emphasis on cultural and linguistic immersion.

### 5-Year Bachelor of Arts and Master of International Affairs

The International Studies department, in conjunction with the Bush School of Government & Public Service, offers a joint degree program that allows International Studies majors to enter the Bush School at the beginning of their fourth year at Texas A&M. This opportunity enables students to receive their International Studies undergraduate degree and a Master of International Affairs (MIA) degree in five years. The partnership between International Studies and the Bush School...
is especially attractive because all graduates from the Bush School’s Masters Program must have proficiency in a foreign language and are encouraged to spend a semester abroad; International Studies majors will have completed this requirement prior to entering the Bush School graduate program. Students admitted to the five-year degree program will have completed 102 hours of the 120 hours of coursework required to receive their bachelor’s degree. These courses must include all of the specific prerequisites for a Bachelor of Arts degree in International Studies (within the Politics and Diplomacy emphasis track), as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree. Students will be required to complete the same two year, 48 hour curriculum as other students admitted to the Bush School’s MPSA program. For information about the 5-year Degree Program, contact the Bush School (http://bush.tamu.edu).

Program Requirements

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<tr>
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<th>Title</th>
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<tr>
<td>INTS 201</td>
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<td>Take the following course three times.</td>
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<td>INTS 205</td>
<td>Current Issues in International Studies</td>
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<td>Select two of the following:</td>
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<td></td>
<td>INTS 400 to 480 (p. 852)</td>
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<td>INTS 485</td>
<td>Directed Studies (no more than 3 hours)</td>
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<td>Independent Honors Study</td>
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<td>Core Courses</td>
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Supporting Courses

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<td></td>
<td>ECON 203</td>
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<td>ECON 320</td>
<td>Economic Development of Europe</td>
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<td>POLS 358</td>
<td>Comparative Judicial Politics</td>
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</table>

Area Studies

Select courses from one of the following areas: 

- Africa 
- Asia 
- Europe 
- Latin America 
- North Africa and the Middle East 

Foreign Language 

International Experience Requirement

College and University Requirements

<table>
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<th>Code</th>
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<td>Select one of the following:</td>
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<td></td>
<td>ENGL 203</td>
<td>Writing about Literature</td>
</tr>
<tr>
<td></td>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
</tr>
<tr>
<td></td>
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</tr>
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<td></td>
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<td>Argumentation and Debate</td>
</tr>
<tr>
<td></td>
<td>Literature in English (p. 465)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics (p. 22)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Creative arts (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences (p. 22)</td>
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<td></td>
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<td>American history (p. 25)</td>
<td>6</td>
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</tr>
<tr>
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<td>State and Local Government</td>
</tr>
<tr>
<td></td>
<td>International and cultural diversity (p. 40)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General electives</td>
<td>7</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours: 120
Choose courses from an approved list on the INTS website in consultation with an advisor. Courses numbered 485 or 489 that contain significant international content can be taken in any department to meet part of the track or area requirement. Students must obtain International Studies advisor approval before taking the 485 or 489 course.

See the Foreign Language paragraph.

At least 3 hours must be in MATH. Three hours may be PHIL 240.

Courses may be used to satisfy other requirements.

**Foreign Language**

Students entering International Studies take a placement exam to determine the level of and number of required foreign language courses. Exam results may fulfill a maximum of 14 semester credit hours.

- Students placed in 101 will take 101, 102 and 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 102 will take 102, 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 201 will take 201 and 202 and 6 semester credit hours at the 300- or 400-level.
- Students placed in 202 will take 202 and 6 semester credit hours at the 300- or 400-level.
- Students placing out of 101, 102, 201 and 202 will take 6 semester credit hours at the 300- or 400-level.

**International Experience Requirements**

The International Experience must generate at least 3 hours of Texas A&M University credit. Departmental approval is required before travel. Any international experience that does not meet these criteria will not count toward the degree. International Experience must be completed prior to admission into the 5-year Degree Program.

- Must be at least one long semester or one 10-week summer approved experience.
- Must be taken after completion of 100- and 200-level language requirement and INTS 201.
- Must be completed before student is eligible to enroll in INTS 481, INTS 491 or INTS 497.
- Must be an immersion experience in the foreign culture and language, which can be satisfied by:
  - An internship at a company, government agency or non-profit operation involving significant use of the foreign language. Three hours of INTS 484 elective credit can be given.
  - Courses taken at a foreign university. Courses may count for Texas A&M University credit with approval of the advisor of the relevant department. These courses cannot apply to the International Studies core. One course must be taken in the foreign language at the 300- or 400-level.
  - Selected Texas A&M University Study Abroad programs which involve intensive cultural and language immersion.
  - A combination of the above to equal the requirement of a long semester or a 10-week summer-approved experience.
  - Must be taken outside of the student’s country of origin.
  - Must be taken in one foreign country that matches with the foreign language and the area study requirement unless approved by the department head before travel.

Other courses may qualify for the college and university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or in the International Studies Degree Program Office. The list incorporates University Core Curriculum requirements. No course can be counted in more than one category, except as allowed in the International and Cultural Diversity graduation requirement.

See the MIA program in the Graduate and Professional Catalog for the MIA requirements.

**Modern Languages - BA, French Option**

The department offers a wide range of courses in Modern Languages at all levels of the undergraduate curriculum as part of its mission to support and advance the international and global competencies of university students. At present, students can earn a BA in Modern Languages with options in French, German or Russian. Courses are designed to offer students extended study of the language, literatures, and cultures of these language communities. The department insists on a high competence in the language, which is the basis for all other options. Students will be required to complete, by coursework or placement test, all 100- and 200-level courses in sequence (except FREN 221/FREN 222, GERM 221/GERM 222 and RUSS 221/RSUSS 222, which are taken concurrently) before taking any upper-level course, unless an upper-level course permits co-registration or skipping a lower course in the sequence (see inventory of courses for prerequisites). Once a student has received credit for a higher-level language course, the student is no longer eligible to receive credit for prerequisite courses. In addition to classes at the College Station campus, the department offers summer study abroad programs for credit. Departmental faculty and advising staff also work closely with students to match their interests with semester and full-year programs abroad.

**Program Requirements**

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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Required courses</strong></td>
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</tr>
<tr>
<td>FREN 201</td>
<td>Intermediate French I</td>
<td>3</td>
</tr>
<tr>
<td>or FREN 22</td>
<td>or Field Studies I</td>
<td></td>
</tr>
<tr>
<td>FREN 202</td>
<td>Intermediate French II</td>
<td>3</td>
</tr>
<tr>
<td>or FREN 222</td>
<td>or Field Studies II</td>
<td></td>
</tr>
<tr>
<td>FREN 300 to 499 (p. 817)</td>
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<td>27</td>
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<tr>
<td><strong>Minor Requirement</strong></td>
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<tr>
<td>All majors must select 15-18 hours in a minor field of study</td>
<td>15-18</td>
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<td><strong>College, University Requirements</strong></td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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</tr>
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<td>Literature in English (p. 465)</td>
<td>6</td>
<td></td>
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</tbody>
</table>
Mathematics (p. 22) 3
Language, philosophy and culture (p. 23) 3
Creative arts (p. 24) 3
Life and physical sciences (p. 22) 9
Social and behavioral science (p. 25) 6
American history (p. 25) 6
POLS 206  American National Government 3
POLS 207  State and Local Government 3
International and cultural diversity (p. 40) 4

General electives 18-21
Total Semester Credit Hours 120

1 Minimum of 9 hours at the 400-level.
2 See the Minor Field of Study paragraph.
3 At least three hours must be in MATH. Three hours may be PHIL 240.
4 Courses may be used to satisfy other requirements.

Minor Field of Study

All Modern Language majors must select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors). The minor will consist of a minimum of 15 hours of coursework, as defined by the minor department. No more than 9 credit hours may be at the 100-299 level. Interdisciplinary minors such as women's and gender studies, classical studies, religious studies, and business have specific requirements; students should consult undergraduate advisors in these areas of study. A second major may substitute for the minor. Courses used to meet the minor requirements may not be used in the major. See also the statement on "Minor Field of Study" under the general requirements of the College of Liberal Arts. In general, the careful combination of foreign language skills with other major curricula enhances preparation for careers in business, industry and government. Teaching certification is available to majors through the College of Education and Human Development. Consult the College of Education and Human Development section under secondary teacher certification for additional information.

Any departmental major must earn a "C" or better in all major and minor coursework.

Other courses may qualify for the college and university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Modern Languages - BA, German Option

The department offers a wide range of courses in Modern Languages at all levels of the undergraduate curriculum as part of its mission to support and advance the international and global competencies of university students. At present, students can earn a BA in Modern Languages with options in French, German or Russian. Courses are designed to offer students extended study of the language, literatures, and cultures of these language communities. The department insists on a high competence in the language, which is the basis for all other options. Students will be required to complete, by coursework or placement test, all 100- and 200-level courses in sequence (except

FREN 221/FREN 222, GERM 221/GERM 222 and RUSS 221/RUSS 222, which are taken concurrently) before taking any upper-level course, unless an upper-level course permits co-registration or skipping a lower course in the sequence (see inventory of courses for prerequisites). Once a student has received credit for a higher-level language course, the student is no longer eligible to receive credit for prerequisite courses. In addition to classes at the College Station campus, the department offers summer study abroad programs for credit. Departmental faculty and advising staff also work closely with students to match their interests with semester and full-year programs abroad.

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<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Required Courses</td>
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<tr>
<td>GERM 201</td>
<td>Intermediate German I</td>
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<tr>
<td>or GERM 22</td>
<td>Field Studies I</td>
<td></td>
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<tr>
<td>GERM 202</td>
<td>Intermediate German II</td>
<td>3</td>
</tr>
<tr>
<td>or GERM 222</td>
<td>Field Studies II</td>
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<tr>
<td>GERM 310</td>
<td>Composition</td>
<td>3</td>
</tr>
<tr>
<td>GERM 315</td>
<td>Literary Investigations: German</td>
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</tr>
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<td>GERM 300 to 499 (p. 831)</td>
<td></td>
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</table>

Minor Requirement

All majors must select 15-18 hours in a minor field of study 2 15-18

Study Abroad Requirement

All German majors are required to study abroad 3

College, University Requirement

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Mathematics (p. 22) 4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
<td></td>
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<tr>
<td>Creative arts (p. 24)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>9</td>
<td></td>
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<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>International and cultural diversity (p. 40) 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

General electives 18-21
Total Semester Credit Hours 120

1 Minimum of 6 hours at the 400-level.
2 See the Minor Field of Study paragraph.
3 See the Study Abroad Requirement paragraph.
4 At least three hours must be in MATH. Three hours may be PHIL 240.
Minor Field of Study

All Modern Language majors must select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors). The minor will consist of a minimum of 15 hours of coursework, as defined by the minor department. No more than 9 credit hours may be at the 100-299 level. Interdisciplinary minors such as women's and gender studies, classical studies, religious studies, and business have specific requirements; students should consult undergraduate advisors in these areas of study. A second major may substitute for the minor. Courses used to meet the minor requirements may not be used in the major. See also the statement on "Minor Field of Study" under the general requirements of the College of Liberal Arts. In general, the careful combination of foreign language skills with other major curricula enhances preparation for careers in business, industry and government. Teaching certification is available to majors through the College of Education and Human Development. Consult the College of Education and Human Development section under secondary teacher certification for additional information.

Study Abroad Requirement

All German majors are required to study for one semester or summer in a German-speaking country approved by the department.

Any departmental major must earn a "C" or better in all major and minor coursework.

Other courses may qualify for the college and university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Modern Languages - BA, Russian Option

The department offers a wide range of courses in Modern Languages at all levels of the undergraduate curriculum as part of its mission to support and advance the international and global competencies of university students. At present, students can earn a BA in Modern Languages with options in French, German or Russian. Courses are designed to offer students extended study of the language, literatures, and cultures of these language communities. The department insists on a high competence in the language, which is the basis for all other options. Students will be required to complete, by coursework or placement test, all 100- and 200-level courses in sequence (except FREN 221/GERM 221, FREN 222/GERM 222 and RUSS 221/RUSS 222, which are taken concurrently) before taking any upper-level course, unless an upper-level course permits co-registration or skipping a lower course in the sequence (see inventory of courses for prerequisites). Once a student has received credit for a higher-level language course, the student is no longer eligible to receive credit for prerequisite courses. In addition to classes at the College Station campus, the department offers summer study abroad programs for credit. Departmental faculty and advising staff also work closely with students to match their interests with semester and full-year programs abroad.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
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<tbody>
<tr>
<td>Required courses</td>
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<tr>
<td>RUSS 201</td>
<td>Intermediate Russian I</td>
<td>3</td>
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<td>or</td>
<td>RUSS 222 or Field Studies I</td>
<td>3</td>
</tr>
<tr>
<td>RUSS 202</td>
<td>Intermediate Russian II</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>RUSS 222 or Field Studies II</td>
<td>3</td>
</tr>
<tr>
<td>RUSS 301</td>
<td>Advanced Grammar and Composition I</td>
<td>3</td>
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<td>RUSS 302</td>
<td>Advanced Grammar and Composition II</td>
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<tr>
<td>RUSS 410</td>
<td>Seminar in Russian Studies (emphasizing inquiry and research skills)</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>RUSS 441/</td>
<td>The Russian Novel I: Tolstoy and Dostoevsky</td>
<td>3</td>
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<tr>
<td>EURO 441</td>
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<tr>
<td>RUSS 442/</td>
<td>The Russian Novel II: The Twentieth Century</td>
<td>3</td>
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<tr>
<td>EURO 442</td>
<td>Russian Artistic Culture I: Beginnings to 1900</td>
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<td>RUSS 443/</td>
<td>Contemporary Russian Prose</td>
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<td>EURO 443</td>
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<td>RUSS 444/</td>
<td>Russian Drama</td>
<td>3</td>
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<tr>
<td>EURO 444</td>
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<tr>
<td>RUSS 446/</td>
<td>Russian Artistic Culture II: 1890 to Present</td>
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<tr>
<td>EURO 446</td>
<td>or Russian Artistic Culture II: 1890 to Present</td>
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<td>Select four from the following:</td>
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<td>RUSS 203</td>
<td>to 220 (p. 953)</td>
<td>3</td>
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<tr>
<td>RUSS 223</td>
<td>to 499 (p. 953)</td>
<td>3</td>
</tr>
<tr>
<td>EURO 440</td>
<td>to 449 (up to 6 hours) (p. 809)</td>
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Minor Requirement

All majors must select 15-18 hours in a minor field of study

College, University Requirement

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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>ENGL 104</td>
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<tr>
<td>Select one of the following:</td>
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<td>COMM 243</td>
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<td>International and cultural diversity (p. 40)</td>
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<td></td>
</tr>
</tbody>
</table>
Minor Field of Study

All Modern Language majors must select a minor field of study from departments or divisions within or outside of the College of Liberal Arts or in a particular area of interest (as in the case of interdisciplinary minors). The minor will consist of a minimum of 15 hours of coursework, as defined by the minor department. No more than 9 credit hours may be at the 100-299 level. Interdisciplinary minors such as women’s and gender studies, classical studies, religious studies, and business have specific requirements; students should consult undergraduate advisors in these areas of study. A second major may substitute for the minor. Courses used to meet the minor requirements may not be used in the major. See also the statement on “Minor Field of Study” under the general requirements of the College of Liberal Arts. In general, the careful combination of foreign language skills with other major curricula enhances preparation for careers in business, industry and government. Teaching certification is available to majors through the College of Education and Human Development. Consult the College of Education and Human Development section under secondary teacher certification for additional information.

Any departmental major must earn a “C” or better in all major and minor coursework.

Other courses may qualify for the college and university requirements categories. Students should consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts. The lists incorporate University Core Curriculum requirements. No course can be counted in more than one category.

Arabic Studies - Minor

The minor in Arabic Studies is an academic program open to all students in the university. The minor is interdisciplinary in nature and combines courses in Arabic language and culture with electives in Arabic studies, as well as a capstone project. The minor is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile. In addition, Arabic Studies faculty offer study abroad programs in order to enrich student learning experiences and cultural knowledge while helping students attain higher proficiency in the language.

Students must complete ARAB 101 and ARAB 102 before they may declare a minor in Arabic Studies.

Program Requirements

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ARAB 202</td>
<td>Intermediate Arabic II</td>
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<td>Select two of the following:</td>
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<td>ARAB 301</td>
<td>Reading and Composition</td>
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<tr>
<td>ARAB 302</td>
<td>Reading and Composition II</td>
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Electives

Select two of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>ARAB 221</td>
<td>Introduction to Arabic Language and Society</td>
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<tr>
<td>ARAB 400 to 498 (p. 725)</td>
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<td>COMM 367</td>
<td>Media and the Middle East</td>
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<td>GEOG 320</td>
<td>The Middle East</td>
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<td>HIST 221/ RELS 221</td>
<td>History of Islam</td>
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<td>HIST 347/ RELS 347</td>
<td>Rise of Islam, 600-1258</td>
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<td>HIST 348</td>
<td>Modern Middle East</td>
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<tr>
<td>INTS 251</td>
<td>Contemporary Issues in the Middle East</td>
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<td>INTS 321/ RELS 321/ HUMA 321</td>
<td>Political Islam and Jihad</td>
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</tr>
<tr>
<td>INTS 484</td>
<td>Directed Internship (in an Arabic-speaking country)</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must earn a “C” or better in all minor coursework.

Capstone Project

A capstone project that is completed in an approved upper-division Arabic Studies course is required of all students pursuing a minor in Arabic Studies during their final year of the program. It consists of a substantial research paper (15–20 pages) on an original topic and is conducted under the direction of a faculty member with the approval of the departmental advisors. Through the capstone course and project, students get a chance to integrate their classroom knowledge about the Arab world and use their study-abroad experiences and internships in an Arabic-speaking country, if any, to address an issue of interest to them. Issues that students can choose to address could be of linguistic, cultural, historical, religious, or political nature, among others. Upon its completion, and in coordination with the departmental advisors, the final project will be presented orally to Arabic classes in order to maximize its benefits.

Asian Studies - Minor

The minor in Asian Studies is an academic program open to all students in the university. The minor is interdisciplinary in nature and includes Asian Studies courses in the humanities and the social sciences, as well as a capstone project. The minor is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Asian Studies Humanities Courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select two from the following:</td>
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</tbody>
</table>

Texas A&M University Undergraduate Catalog 535
Please see the departmental advisors for electives and curricular offerings.

## Chinese - Minor

The minor in Chinese is an academic program open to all students in the university. The minor is interdisciplinary in nature and combines courses in Chinese language and culture with electives in Chinese studies, as well as a capstone project. The minor is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile. In addition, Chinese studies faculty offer study abroad programs in order to enrich student learning experiences and cultural knowledge while helping students attain higher proficiency in the language.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 396</td>
<td>Studies in American Literature</td>
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<tr>
<td>HIST 349</td>
<td>The Vietnam War/The American War</td>
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</tr>
<tr>
<td>ASIA 349</td>
<td>World War II in Asia and the Pacific War</td>
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<tr>
<td>HIST 350</td>
<td>Traditional East Asia</td>
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<tr>
<td>ASIA 351</td>
<td>Modern East Asia</td>
<td></td>
</tr>
<tr>
<td>HIST 352</td>
<td>Imperial China</td>
<td></td>
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<tr>
<td>ASIA 354</td>
<td>Modern China</td>
<td></td>
</tr>
<tr>
<td>HIST 355</td>
<td>Twentieth Century Japan</td>
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<tr>
<td>ASIA 356</td>
<td>Society and Population of Modern China</td>
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<td>HIST 358</td>
<td>Chinese Cultural History</td>
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<tr>
<td>ASIA 358</td>
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<tr>
<td>HIST 481</td>
<td>Seminar in History</td>
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<td>HIST 489</td>
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<tr>
<td>RELS 304/</td>
<td>Indian and Oriental Religions</td>
<td></td>
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<tr>
<td>HUMA 304</td>
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<tr>
<td>RELS 489</td>
<td>Special Topics in...</td>
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</table>

### Asian Studies Social Sciences Courses

Select two from the following:

- COMM 335 Intercultural Communication
- COMM 458/Global Media
- JOUR 458
- COMM 460 Communication and Contemporary Issues
- COMM 489 Special Topics in...
- GEOG 489 Special Topics in...
- POLS 365/Asian Governments and Politics
- ASIA 365
- SOCI 329/Pacific Rim Business Behavior
- ASIA 329
- SOCI 463 Gender in Asia
- SOCI 489 Special Topics in...

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHIN 201</td>
<td>Intermediate Chinese I</td>
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</tr>
<tr>
<td>CHIN 202</td>
<td>Intermediate Chinese II</td>
<td>3</td>
</tr>
<tr>
<td>CHIN 301</td>
<td>Reading and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CHIN 302</td>
<td>Reading and Composition II</td>
<td>3</td>
</tr>
<tr>
<td>CHIN 491</td>
<td>Research (Capstone course)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Elective Course

Select one of the following:

- ASIA 306/SOCI 306 Society and Population of Modern China
- HIST 354/ASIA 354 Imperial China
- HIST 355/ASIA 355 Modern China
- HIST 358/ASIA 358 Chinese Cultural History
- POLS 306 Contemporary Political Problems and Issues
- SOCI 306/SOCI 306 Society and Population of Modern China

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIN 201</td>
<td>Intermediate Chinese I</td>
<td>3</td>
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<tr>
<td>CHIN 202</td>
<td>Intermediate Chinese II</td>
<td>3</td>
</tr>
<tr>
<td>CHIN 301</td>
<td>Reading and Composition</td>
<td>3</td>
</tr>
<tr>
<td>CHIN 302</td>
<td>Reading and Composition II</td>
<td>3</td>
</tr>
<tr>
<td>CHIN 491</td>
<td>Research (Capstone course)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Semester Credit Hours

18

Students must earn a "C" or better in all minor coursework.

### Capstone Project

The capstone project allows students to integrate knowledge and skills about topics pertaining to Chinese language, culture, history, geography, etc. that they have gained through their coursework, including any study abroad experience in China. Students will consult with the faculty in Chinese and meet regularly with a faculty advisor to complete an independent research project about a topic of their interest pertaining to China.

### Classical Studies - Minor

The Minor in Classical Studies is an academic program open to all students in the university. The minor is interdisciplinary in nature and combines courses in Greek or Latin language with electives in multiple disciplines. The focus on the history, beliefs, and material culture...
of ancient Greek and Roman civilization helps students to see how fundamental concepts of Western Civilization first arose in Classical Antiquity, and is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Greek Language</strong></td>
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<tr>
<td>CLAS 211</td>
<td>Intermediate Greek</td>
<td>3</td>
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<tr>
<td>CLAS 310 to 319 (p. 759)</td>
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<td>9</td>
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<tr>
<td><strong>Electives</strong></td>
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<td>Select two of the following:</td>
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<tr>
<td>CLAS 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<tr>
<td>CLAS 250 to 499 (p. 759)</td>
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<tr>
<td>ANTH 317/ Introduction to Biblical Archaeology</td>
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<tr>
<td>RELS 317</td>
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<tr>
<td>ARCH 430</td>
<td>History of Ancient Architecture</td>
<td></td>
</tr>
<tr>
<td>ARCH 434</td>
<td>The Role of Sculpture and Painting in Ancient Architecture</td>
<td></td>
</tr>
<tr>
<td>PHIL 410</td>
<td>Classical Philosophy</td>
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<td><strong>Total Semester Credit Hours</strong></td>
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</tr>
</tbody>
</table>

**Students must earn a "C" or better in all minor coursework.**

**French - Minor**

The Minor in French is an academic program open to all students in the university. The minor combines courses in French language and culture, and is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>FREN 201</td>
<td>Intermediate French I or FREN 221 or Field Studies I</td>
<td>3</td>
</tr>
<tr>
<td>FREN 202</td>
<td>Intermediate French II or FREN 222 or Field Studies II</td>
<td>3</td>
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<tr>
<td>FREN 300</td>
<td>Written Communication in the French-Speaking World</td>
<td>3</td>
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<tr>
<td>Select three from the following:</td>
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<tr>
<td>FREN 301 to 499 (p. 817)</td>
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<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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<td>18</td>
</tr>
</tbody>
</table>

**Students must make a grade of "C" or better in all minor coursework.**

**German - Minor**

The Minor in German is an academic program open to all students in the university. The minor combines courses in German language and culture, and is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile. In addition, German studies faculty offer study abroad programs in order to enrich student learning experiences and cultural knowledge while helping students attain higher proficiency in the language.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select two-semester or one-semester sequence of Intermediate German</td>
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<tr>
<td>GERM 201</td>
<td>Intermediate German I or GERM 202 or Field Studies I</td>
<td>6</td>
</tr>
<tr>
<td>and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERM 202</td>
<td>Intermediate German II or GERM 204 or Field Studies II</td>
<td>6</td>
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<tr>
<td>or</td>
<td></td>
<td></td>
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<tr>
<td>GERM 204</td>
<td>Intensive Intermediate German or GERM 310 Composition</td>
<td>3</td>
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<tr>
<td>or</td>
<td></td>
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</tr>
<tr>
<td>GERM 310</td>
<td>Literary Investigations: German Short Fiction</td>
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</tr>
<tr>
<td>GERM 300 to 499 (p. 831)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

**Students must make a grade of C or better.**

**Italian - Minor**

The Minor in Italian is an academic program open to all students in the university. The minor combines courses in Italian language and culture, and is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile. In addition, Italian studies faculty offer study abroad programs in order to enrich student learning experiences and cultural knowledge while helping students attain higher proficiency in the language.
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITAL 201</td>
<td>Intermediate Italian I</td>
<td>3</td>
</tr>
<tr>
<td>ITAL 202</td>
<td>Intermediate Italian II</td>
<td>3</td>
</tr>
<tr>
<td>ITAL 303</td>
<td>Composition and Conversation</td>
<td>3</td>
</tr>
<tr>
<td>Select three of the following:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>ITAL 300 to 499 (p. 858)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all minor coursework.

Japanese - Minor

The Minor in Japanese is an academic program open to all students in the university. The minor is interdisciplinary in nature and combines courses in Japanese language and culture with electives in Japanese studies, as well as a capstone project. The minor is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile. In addition, Japanese studies faculty offer study abroad programs in order to enrich student learning experiences and cultural knowledge while helping students attain higher proficiency in the language.

Students must complete JAPN 101 and JAPN 102 before they may declare a minor in Japanese.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAPN 201</td>
<td>Intermediate Japanese I</td>
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</tr>
<tr>
<td>JAPN 202</td>
<td>Intermediate Japanese II</td>
<td>4</td>
</tr>
<tr>
<td>JAPN 301</td>
<td>Upper Level Japanese I</td>
<td>3</td>
</tr>
<tr>
<td>JAPN 302</td>
<td>Upper Level Japanese II</td>
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</tr>
<tr>
<td>JAPN 491</td>
<td>Research</td>
<td>1</td>
</tr>
</tbody>
</table>

Elective Course

Select one of the following:

- FILM 481 Seminar in Film Studies
- HIST 350/ Asia 350 World War II in Asia and the Pacific
- HIST 351/ Asia 351 Traditional East Asia
- HIST 352/ Asia 352 Modern East Asia
- HIST 356/ Asia 356 Twentieth Century Japan
- JAPN 401 Advanced Japanese I
- JAPN 402 Advanced Japanese II
- SOCI 329/ Asia 329 Pacific Rim Business Behavior
- SOCI 463 Gender in Asia

Select two from the following:

- RUSS 446/ EURO 446 Russian Artistic Culture I: Beginnings to 1900
- or RUSS 447/ EURO 447 Russian Artistic Culture II: 1890 to Present
- RUSS 300 to 499 (p. 953)

Total Semester Credit Hours 18

Students must make a grade of "C" or better in all minor coursework.

Capstone Project

A capstone project completed in an approved upper-division Japanese course is required of all students pursuing a minor in Japanese during their final year of the program. The capstone project allows students to integrate knowledge and skills about topics pertaining to Japanese language, culture, history, geography, etc. that they gained through their previous classes, study abroad experience in Japan, or personal readings. Students will consult and regularly meet with an advisor to complete a reading/writing assignment about a topic of their interest pertaining to Japan.

Russian - Minor

The Minor in Russian is an academic program open to all students in the university. The minor combines courses in Russian language and culture, and is a valuable complement to the academic portfolio of any student majoring in the humanities, social sciences, or natural sciences, who wishes to add an international dimension to their intellectual profile. In addition, Russian studies faculty offer study abroad programs in order to enrich student learning experiences and cultural knowledge while helping students attain higher proficiency in the language.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUSS 201</td>
<td>Intermediate Russian I</td>
<td>3</td>
</tr>
<tr>
<td>or RUSS 221/ Field Studies I</td>
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<tr>
<td>RUSS 202</td>
<td>Intermediate Russian II</td>
<td>3</td>
</tr>
<tr>
<td>or RUSS 221/ Field Studies II</td>
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<tr>
<td>RUSS 301</td>
<td>Advanced Grammar and Composition I</td>
<td>3</td>
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<tr>
<td>or RUSS 302/ Advanced Grammar and Composition II</td>
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<tr>
<td>RUSS 446/ EURO 446 Russian Artistic Culture I: Beginnings to 1900</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or RUSS 447/ EURO 447 Russian Artistic Culture II: 1890 to Present</td>
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<td>Select two from the following:</td>
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<tr>
<td>RUSS 211 Russian Conversation</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Students must earn a "C" or better in all minor coursework.

1 Other elective courses may be chosen in consultation with the departmental advisors.

Department of Performance Studies

Performance Studies is an inquiry-based humanities field that examines relationships between performance and culture. Students study music and theatre performance as practice and use performance as a method of inquiry. Performance Studies investigates traditional art forms such as music, theatre, and dance as well as a range of cultural expressions.
such as ritual, festivals, games and sports, parades, storytelling, clothing, social arts, and mass media. Students learn performance skills that enhance intellectual inquiry. Through performance, students learn to engage creatively with the world around them in an on-going process of inquiry and meaning-making. In the course of their work in the Performance Studies BA, students will develop a perspective on artistic practice that crosses genres, the ability to think independently and creatively, and a commitment to the performing arts as socially engaged practice.

The BA in Performance Studies provides a foundation for careers that combine skills and knowledge gained in the study, practice, and critical analysis of performance. A comprehensive BA in Performance Studies can prepare students for a variety of careers, including arts administration, education, journalism, art criticism, entertainment management, public sector arts advocacy, museum administration, corporate or nonprofit communications, community development, arts therapy, marketing and market research, public relations, media production, gallery management, social and public service, international and non-governmental organization work, and sonic/scene design as well as advanced study or professional work in music or theatre.

**Majors**

- Bachelor of Arts in Performance Studies  (p. 539)

**Minors**

- Performance Studies Minor (p. 540)
- Performance Technology Minor (p. 540)

**Performance Studies - BA**

Performance Studies investigates traditional art forms such as music, theatre, and dance as well as a range of cultural expressions including ritual, festivals, games and sports, parades, storytelling, clothing, social arts, technology, and mass media. The BA in Performance Studies offers a flexible curriculum that allows students the opportunity to think independently and build a course work that supports individual interests. Through performance in music and theatre, students develop a commitment to the performing arts as socially engaged practice and prepare for a wide variety of careers.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERF Required Core</td>
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</tr>
<tr>
<td>PERF 101</td>
<td>Introduction to Performance Studies</td>
<td>3</td>
</tr>
<tr>
<td>PERF 301</td>
<td>Performance in World Cultures</td>
<td>3</td>
</tr>
<tr>
<td>PERF 303</td>
<td>Creating Performance</td>
<td>3</td>
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<tr>
<td>PERF 481</td>
<td>Capstone Seminar: Performance as Research</td>
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<tr>
<td>PERF Electives</td>
<td>Select four from the following:</td>
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<td>MUSC 102</td>
<td>Fundamentals of Music</td>
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<td>MUSC 204</td>
<td>Music Theory I</td>
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<td>MUSC 205</td>
<td>Music Theory II</td>
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<td>MUSC 209</td>
<td>Global Musicianship</td>
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<td>MUSC 211</td>
<td>Collaborative Musicianship</td>
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<td>MUSC 214</td>
<td>Perspectives on World Music</td>
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<td>MUSC 228</td>
<td>History of Electronic Music</td>
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<td>MUSC 235</td>
<td>Introduction to Composition</td>
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<td>MUSC 245</td>
<td>Composition I</td>
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<td>MUSC 255</td>
<td>Keyboard Instruction</td>
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<td>MUSC 259</td>
<td>Individual Performance via Classroom Instruction</td>
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<td>MUSC 281</td>
<td>Ensemble Performance–Small Ensembles</td>
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<td>MUSC 316</td>
<td>Music and Technology</td>
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<td>MUSC 317</td>
<td>Recording and the Producer</td>
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<td>MUSC 318</td>
<td>Electronic Composition</td>
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<td>PERF 318</td>
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<td>MUSC 324</td>
<td>Music in World Cultures</td>
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<td>ANTH 324</td>
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<tr>
<td>MUSC 325</td>
<td>Dance and World Cultures</td>
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<td>PERF 325</td>
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<tr>
<td>MUSC 326</td>
<td>Dance and Identity in the United States</td>
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<td>MUSC 327</td>
<td>Popular Musics in the African Diaspora</td>
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<tr>
<td>MUSC 328</td>
<td>Japanese Traditional Performing Arts</td>
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<td>THAR 328</td>
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<tr>
<td>MUSC 345</td>
<td>Composition II</td>
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<td>MUSC 355</td>
<td>Individual Performance—Keyboard II</td>
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<tr>
<td>MUSC 386</td>
<td>Evolution of the American Musical</td>
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<td>THAR 386</td>
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<td>MUSC 402</td>
<td>Intermedia Performance</td>
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<td>MUSC 424</td>
<td>TOPICS ETHNOMUSICOCLOGY</td>
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<td>MUSC 491</td>
<td>Research</td>
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<td>PERF 202</td>
<td>Introduction to Performance Technology</td>
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<td>PERF 285</td>
<td>Directed Studies</td>
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<td>PERF 289</td>
<td>Special Topics in...</td>
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<td>PERF 291</td>
<td>Research</td>
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<td>PERF 310</td>
<td>History of Performance in the Ancient World</td>
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<td>PERF 311</td>
<td>History of Performance in the Common Era</td>
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<td>PERF 312</td>
<td>History of Performance Modern Era</td>
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<td>PERF 318</td>
<td>Electronic Composition</td>
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<tr>
<td>MUSC 318</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERF 325</td>
<td>Dance and World Cultures</td>
<td></td>
</tr>
<tr>
<td>MUSC 325</td>
<td></td>
<td></td>
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<tr>
<td>PERF 326</td>
<td>Dance and Identity in the United States</td>
<td></td>
</tr>
<tr>
<td>MUSC 327</td>
<td>Popular Musics in the African Diaspora</td>
<td></td>
</tr>
<tr>
<td>PERF 402</td>
<td>Intermedia Performance</td>
<td></td>
</tr>
<tr>
<td>PERF 484</td>
<td>Performance Studies Internship</td>
<td></td>
</tr>
<tr>
<td>PERF 491</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>PERF 492</td>
<td>Cooperative Education in Performance Studies</td>
<td></td>
</tr>
<tr>
<td>PERF 489</td>
<td>Special Topics in...</td>
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</tr>
</tbody>
</table>
THAR 102  Text and Performance Analysis
THAR 110  Acting I: Fundamentals
THAR 135  Theatre Technology I
THAR 245  Critical Design Studies
THAR 302  Dramaturgy
THAR 308  Stage Management and Arts Administration
THAR 321  Collaborative Design Process
THAR 322  Collaborative Performing
THAR 328/ MUSC 328  Japanese Traditional Performing Arts
THAR 386/ MUSC 386  Evolution of the American Musical
THAR 407  Performing Literature.
THAR 420  Directing Live Performance
THAR 435  New Technology for Performance Design
THAR 445  Design as Performance
THAR 482  Topics in American Theatre and Performance

PERF Seminars
Select three from the following: 9
PERF 450  Seminar in 20th-21st Century Performance
PERF 451  Seminar in Historical Performance
PERF 452  Seminar in Global Performance
PERF 453  Seminar in Performance Ethnography
PERF 454  Seminar Performing the City
PERF 460  Seminar in Performance Theory
PERF 461  Seminar in Folklore

College and University Requirements
Communication
ENGL 104  Composition and Rhetoric 3
Select one of the following: 3
ENGL 203  Writing about Literature
ENGL 210  Technical and Business Writing
COMM 203  Public Speaking
COMM 205  Communication for Technical Professions
COMM 243  Argumentation and Debate

General electives 2 19
Total Semester Credit Hours 120

1  Complete six hours of International and Cultural Diversity coursework. Courses may be used to satisfy other requirements.
2  Up to 12 hours of courses from MUSC 300-499, THAR 300-499, or PERF 300-499 may be applied.

General Degree Requirements:
Minimum 2.0 GPA overall and a minimum 2.0 GPA in major coursework.
A grade of C or higher is required in all coursework within the major.
18 hours of major coursework completed at Texas A&M.
Complete 36 hours of upper division (300-400 level) hours in residence, 12 hours of which must be completed in major coursework.
Complete two PERF courses formally designated as writing intensive.

Performance Studies - Minor
Performance Studies investigates traditional art forms such as music, theatre, and dance as well as a range of cultural expressions including ritual, festivals, games and sports, parades, storytelling, clothing, social arts, technology, and mass media. The BA in Performance Studies offers a flexible curriculum that allows students the opportunity to think independently and build a course work that supports individual interests. Through performance in music and theatre, students develop a commitment to the performing arts as socially engaged practice and prepare for a wide variety of careers.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERF 101</td>
<td>Introduction to Performance Studies</td>
<td>3</td>
</tr>
<tr>
<td>PERF 301</td>
<td>Performance in World Cultures</td>
<td>3</td>
</tr>
<tr>
<td>Select four from:</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>PERF 100 to 499 (p. 924)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 18

Minimum of 6 hours at 300- to 400-level.
Minimum 2.7 GPA.

Performance Technology - Minor
The Minor in Performance Technology is open to all majors and provides students research experiences through interdisciplinary technology-based performances. Required courses in the minor include an introductory survey of essential concepts and skills (PERF 202) and a capstone course in Intermedia Performance based on interdisciplinary collaboration (PERF 402). Additional courses in the minor are drawn from the Music, Performance Studies, or Theatre Arts curricula focusing on advanced applications and analysis of technology in performance including consideration of aural, visual, and human components; sensors and actuators; data and programming; construction; and composition, design, improvisation, and devised performance.
Program Requirements

Required courses in the minor include an introductory survey of essential concepts and skills (PERF 202) and a capstone course in Intermedia Performance based on interdisciplinary collaboration (PERF 402). Additional courses in the minor are drawn from the Music, Performance Studies, or Theatre Arts curricula focusing on advanced applications and analysis of technology in performance including consideration of aural, visual, and human components; sensors and actuators; data and programming; construction; and composition, design, improvisation, and devised performance. Students are encouraged to propose or apply for unique performance and research experiences (PERF 483 and PERF 491) in order to build their portfolios and better align their coursework with their professional goals.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERF 202</td>
<td>Introduction to Performance Technology</td>
<td>3</td>
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<tr>
<td>PERF 402</td>
<td>Intermedia Performance</td>
<td>3</td>
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<tr>
<td>Select four of the following:</td>
<td>12</td>
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<tr>
<td>MUSC 316</td>
<td>Music and Technology</td>
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<tr>
<td>MUSC 317</td>
<td>Recording and the Producer</td>
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<tr>
<td>MUSC 491</td>
<td>Research</td>
<td></td>
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<tr>
<td>PERF 318/</td>
<td>Electronic Composition</td>
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<tr>
<td>MUSC 318</td>
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<tr>
<td>PERF 483</td>
<td>Performance Practicum</td>
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<td>PERF 491</td>
<td>Research</td>
<td></td>
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<tr>
<td>THAR 435</td>
<td>New Technology for Performance Design</td>
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<td>THAR 445</td>
<td>Design as Performance</td>
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<tr>
<td>THAR 491</td>
<td>Research</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

A minimum of six semester credit hours must be at the 300-400 level.

Students must make a grade of "C" or better in all courses.

The capstone course, PERF 402, allows students to integrate and apply knowledge and skills pertaining to technology-based performance in interdisciplinary collaborative projects.

Department of Philosophy and Humanities

The Greek philosopher Socrates once said that the unexamined life is not worth living. For more than 2,000 years, philosophy has been the source of the most intensely reflective, influential and argued versions of that examination. The concerns of philosophy range from the arts, the methods and foundations of the sciences, politics, education, and religion to the complex questions relating to the meaning of reality, truth, values and the significance of human history. The study of philosophy is an essential dimension of a well-educated person.

Philosophy seeks to establish standards of evidence, provide rational methods of resolving conflicts, and create techniques for evaluating ideas and arguments. Philosophy develops the capacity to see the world from the perspectives of other individuals and other cultures; it enhances one’s ability to perceive the relationships among the various fields of study, and it deepens one’s sense of the meaning and variety of human experience.

Toward these ends the program in philosophy at Texas A&M is structured to provide students with the skills necessary to appreciate more fully the central concerns of human existence and develop abilities in problem-solving, communication, persuasion, writing, and critical thinking.

Students, along with parents and friends, often assume that the only undergraduates who major in philosophy are those who intend to pursue graduate degrees in philosophy, theology and law. The breadth of skills developed, however, makes the study of philosophy appropriate for students entering professional fields such as medicine, business and education, and for those preparing for graduate work in the humanities or the social sciences.

It should be stressed that the non-academic value of a field of study must not be viewed mainly in terms of its contribution to obtaining one’s first job after graduation. Students are understandably preoccupied with getting their first job, but even from a narrow vocational point of view it would be short-sighted to concentrate on that at the expense of developing potential for success and advancement once hired. Factors leading to initial employment are not necessarily those that lead to promotions or beyond a first position. This is so because the needs of many employers alter with changes in social and economic patterns. It is therefore crucial to see beyond the specifics of a job description.

As this suggests, there are people trained in philosophy in just about every field. They have gone into not only such professions as teaching, medicine, and law, but also into computer science, management, publishing, sales, government service, criminal justice, public relations, and other fields.

Majors
• Bachelor of Arts in Philosophy (p. 541)

Minors
• Philosophy Minor (p. 542)

Certificates
• Philosophy Pre-Law Certificate (p. 542)

Philosophy - BA

The program in philosophy at Texas A&M is structured to provide students with the skills necessary to appreciate more fully the central concerns of humans existence and develop abilities in problem-solving, communication, persuasion, writing and critical thinking. In essence, the study of Philosophy is what college is all about: engaging with topics that matter; cultivating skills that will carry you the rest of your life.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 111</td>
<td>Contemporary Moral Issues</td>
<td>3</td>
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<tr>
<td>PHIL 205</td>
<td>Technology and Human Values</td>
<td></td>
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<tr>
<td>PHIL 208</td>
<td>Philosophy of Education</td>
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<tr>
<td>PHIL 251</td>
<td>Introduction to Philosophy</td>
<td></td>
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</tbody>
</table>
PHIL 252/ AFST 252
PHIL 283

Select one of the following:
- HUMA 304/ Indian and Oriental Religions
- RELS 304
- PHIL 410
- Classical Philosophy
- PHIL 411
- Medieval Philosophy

Select one of the following:
- PHIL 414
- Nineteenth Century Philosophy
- PHIL 415
- American Philosophy
- PHIL 416
- Recent British and American Philosophy
- PHIL 417
- Phenomenology
- PHIL 418
- Existentialism

PHIL 412
- Seventeenth-Century Philosophy
or PHIL 413
- or Eighteenth-Century Philosophy

PHI Electives (p. 928)

College and University Requirements
- ENGL 104
  - Composition and Rhetoric
- PHIL 240
- Introduction to Logic
- POLS 206
- American National Government
- POLS 207
- State and Local Government

Select one of the following:
- ENGL 203
  - Writing about Literature
- ENGL 210
  - Technical and Business Writing
- COMM 203
- Public Speaking
- COMM 205
- Communication for Technical Professions
- COMM 243
- Argumentation and Debate

American History (p. 25)
Creative Arts (p. 24)
Electives
Foreign Language (p. 465)
International and Cultural Diversity (p. 40)
Life and Physical Sciences (p. 22)
Literature in English (p. 465)
Mathematics (p. 22)
Language, Philosophy and Culture (p. 23)
Social and Behavioral Sciences (p. 25)

Select one of the following:
- Creative Arts (p. 24)
- Language, Philosophy and Culture (p. 23)

Total Semester Credit Hours

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>PHIL 300 to 499 (p. 928)</td>
<td>3-15</td>
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<tr>
<td>PHIL 100 to 299 (p. 928)</td>
<td>0-6</td>
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</tbody>
</table>

Total Semester Credit Hours: 15

1 Up to six semester credit hours may be selected from PHIL 100 - PHIL 299 (p. 928).

Students must make a grade of "C" or better in all courses.

Philosophy Pre-Law - Certificate

The Department of Philosophy offers a Pre-Law Certificate that is primarily guided by the published recommendations of the American Bar Association (A.B.A.). The A.B.A. encourages prospective law students to pursue classes that cultivate a set of skills that will enhance the study of law. The study of philosophy lends itself to the development of these recommended skills. To this end, Philosophy's Pre-Law Certification requires that students take classes that typically cultivate the A.B.A.'s recommended skill set:

1. **Problem Solving** involves "courses and other experiences that will engage [students] in critical thinking about important issues, challenge ... beliefs and improve ... tolerance for uncertainty and criticism."[^1]
2. **Critical Reading** involves "close reading and critical analysis of complex textual material."[^1]
3. **Writing and Editing** involves "preparing original pieces of substantial length and revising written work in response to constructive criticism. [...] Language is the most important tool of a lawyer, and lawyers must learn how to express themselves clearly and concisely."[^1]
4. **Oral Communication and Listening** involves "the ability to speak clearly and persuasively... and excellent listening skills."[^1]
5. **Research** involves "undertaking a project that requires significant library research and the analysis of large amounts of information obtained from that research."[^1]

The Certification requires students to take 12 hours of classes, one of which is an introduction to logic and 9 of which are at the 300-400 level. Students must complete at least one Philosophy class that is writing intensive.

[^1]: [http://www.americanbar.org/groups/legal_education/resources/pre_law.html](http://www.americanbar.org/groups/legal_education/resources/pre_law.html)

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one from:

[^1]: [http://www.americanbar.org/groups/legal_education/resources/pre_law.html](http://www.americanbar.org/groups/legal_education/resources/pre_law.html)
PHIL 332  Social and Political Philosophy
PHIL 334  Philosophy of Law
Select one from:
PHIL 485  Directed Studies
PHIL 491  Research
PHIL 497  Independent Honors Studies
PHIL 300 to 499 (p. 928) 3
PHIL 300 to 499 (p. 928) 3
Total Semester Credit Hours 12

1 Must be any course with a 'W' designation.

Department of Political Science

Political science is a social science that investigates collective decision-making. It is concerned with governments, individuals' attitudes and choices, and the interactions between governing institutions and mass behavior. Among other things, political science addresses power, authority, influence, identity, ethics, law, liberty, justice, wealth, and violence.

The study of political science introduces students to a powerful set of analytical tools for understanding interactions within and among groups of people. These include systematic knowledge of recurring patterns and problems in political life and methods for collecting and analyzing data and other forms of evidence. Studying political science also cultivates critical thinking and effective communication and prepares students for active citizenship, professional success, and lifelong learning.

Undergraduate Courses

The Department of Political Science offers courses in all facets of the discipline: American Politics, International Relations, Comparative Politics, Political Theory, Political Methodology, Public Administration and Policy, and Race and Ethnic Politics.

American Politics

American politics involves the study of the institutions of national government, law, mass political behavior, elections, political communication and media, interest groups, political parties, state and local governments, urban politics, and identity in politics in the United States.

International Relations

International relations involve the study of relations between the governments of the world. Courses are offered in world politics, American foreign relations, and national security policy.

Comparative Politics

This area of political science allows students to develop an in-depth understanding of foreign governments and politics. Courses are offered in European governments, Latin American governments, Asian governments, Russia and the former Soviet states, and in the politics of inequality and globalization.

Political Theory

The study of political theory provides students with an understanding of the fundamental relationships between governments and people.

Courses range from the study of Greek antiquity to contemporary political ideologies.

Public Administration and Policy

This area of political science encompasses the study of public administration and the role of public policy in American politics. Study in this area will provide the student with the opportunity to understand the fundamentals of administration within a political environment. Courses are offered in bureaucracy and administration, state and local finance, urban administration, and government and the economy.

Political Methodology

These courses introduce students to scientific research design, statistical analysis, and game theory.

Race and Ethnic Politics

These courses provide the student with an in-depth understanding of the role of diversity in politics.

5-Year Degree Programs

The Political Science Department offers a joint degree program in conjunction with the Bush School of Government and Public Service. This program enables students to receive either a B.A. or B.S. in political science and a Master of Public Service and Administration (MPSA) degree in five years.

The Political Science Department also offers a joint degree program in conjunction with the University of Essex. This program enables students to receive either a B.A. or B.S. in political science and a Master of Arts or a Master of Science in Political Science in four and a half years.

Honors Program

The Department of Political Science participates actively in the University honors program. Honors courses are available in all areas of political science. In addition, students may graduate with honors distinction in political science. Honor students also are offered individual instruction under POLS 497. Students interested in the Department's Honors Program should contact the Political Science Undergraduate Programs Office.

Teacher Certification

Students desiring certification to teach civics or government in secondary schools in Texas must meet special additional requirements.

More complete information on requirements for teacher certification may be found in the College of Education and Human Development section under secondary certification.

Faculty

Baer, Judith A, Professor
Political Science
PHD, University of Chicago, 1974

Betz, Timm L, Assistant Professor
Political Science
PHD, University of Michigan, 2015
Bond, Jon R, Professor
Political Science
PHD, University of Illinois at Urbana-Champaign, 1978

Bragg, Belinda L, Lecturer
Political Science
PHD, Texas A&M University, 2006

Cheibub, Jose A, Professor
Political Science
PHD, University of Chicago, 1994

Clark, William, Professor
Political Science
PHD, Rutgers, The State University of New Jersey, 1994

Conway, Nicholas D, Lecturer
Political Science
JD, Indiana University School of Law Bloomington, 2003

Cook, Scott J, Assistant Professor
Political Science
PHD, University of Pittsburgh, 2014

Edwards, George C, Distinguished Professor
Political Science
PHD, University of Wisconsin - Madison, 1973

Ellis, Lisa D, Lecturer
Political Science
MFA, Columbia College Chicago, 2007

Escobar-Lemmon, Maria, Professor
Political Science
PHD, The University of Arizona, 2000

Fortunato, David, Assistant Professor
Political Science
PHD, Rice University, 2012

Fuhrmann, Matthew C, Professor
Political Science
PHD, University of Georgia, 2008

Fulton, Sarah A, Associate Professor
Political Science
PHD, University of California, Davis, 2006

Geva, Nehemia, Associate Professor
Political Science
PHD, The Ohio State University, 1977

Harmel, Robert, Professor
Political Science
PHD, Northwestern University, 1977

Hollenbach, Florian M, Assistant Professor
Political Science
PHD, Duke University, 2015

Jo, Hyeran, Associate Professor
Political Science
PHD, University of Michigan, 2008

Kaya, Ruchan, Visiting Assistant Professor
Political Science
PHD, University of Florida, 2014

Kellstedt, Paul M, Professor
Political Science
PHD, University of Minnesota, Twin Cities, 1996

Koch, Michael T, Associate Professor
Political Science
PHD, University of California, Davis, 2002

Li, Quan, Professor
Political Science
PHD, Florida State University, 1998

Lim, Phaik S, Senior Lecturer
Political Science
PHD, University of Houston, 2003

Lipsmeyer, Christine S, Associate Professor
Political Science
PHD, Vanderbilt University, 1999

Nederman, Cary J, Professor
Political Science
PHD, York University, 1983

O’Brien, Diana Z, Associate Professor
Political Science
PHD, Washington University in St. Louis, 2012

O’Hearn, Denis A, Professor
Political Science
PHD, University of Michigan, 1988

Ogden, Benjamin, Assistant Professor
Political Science
PHD, Boston University, 2016

Palmer, Erica O, Assistant Professor
Political Science
PHD, University of Illinois at Urbana-Champaign, 1991

Perry, Brittany N, Instructional Assistant Professor
Political Science
PHD, Duke University, 2013

Pond, Amy, Assistant Professor
Political Science
PHD, University of Michigan, 2015

Rainey, Robert C, Assistant Professor
Political Science
PHD, Florida State University, 2013

Ramasubramanian, Srividya, Associate Professor
Political Science
PHD, The Pennsylvania State University, 2004
Rice, Mitchell F, Professor
Political Science
PHD, Claremont Graduate School, 1976

Robertson, John D, Professor
Political Science
PHD, University of Illinois at Urbana-Champaign, 1979

Roblyer, Dwight A, Lecturer
Political Science
PHD, Texas A&M University, 2009

Rogers, James R., Associate Professor
Political Science
PHD, University of Iowa, 1994

Smith, Jason M, Instructional Assistant Professor
Political Science
PHD, Texas A&M University, 2009

Teodoro, Manuel P, Associate Professor
Political Science
PHD, Indiana University, 1977

Taylor, Michelle M, Professor
Political Science
PHD, Rice University, 1990

Whitten, Guy D, Professor
Political Science
PHD, University of Houston, 1987

Majors

• Bachelor of Arts in Political Science (p. 545)
• Bachelor of Arts in Political Science and Master of Public Service and Administration, 5-Year Degree Program (p. 546)
• Bachelor of Science in Political Science (p. 546)
• Bachelor of Science in Political Science and Master of Public Service and Administration, 5-Year Degree Program (p. 547)

Political Science - BA

The Department of Political Science offers a Bachelor of Arts in Political Science. The B.A. degree program offers a strong liberal arts curriculum aimed at enhancing students’ understanding of politics along with essential training in social science research methods, developing habits of critical thinking, and enhancing students’ written, verbal, and visual communications skills.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 200</td>
<td>Foundations of Political Science</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 209</td>
<td>Introduction to Political Science Research ¹</td>
<td>3</td>
</tr>
<tr>
<td>Select three of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLS 203</td>
<td>Introduction to Political Theory</td>
<td>3</td>
</tr>
<tr>
<td>POLS 229</td>
<td>Introduction to Comparative Politics</td>
<td>3</td>
</tr>
<tr>
<td>POLS 231</td>
<td>Introduction to World Politics</td>
<td>3</td>
</tr>
<tr>
<td>POLS 233</td>
<td>Politics and Policy in the United States</td>
<td>3</td>
</tr>
<tr>
<td>Political Science electives (p. 936)</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

College and University Requirements

| ENGL 104 | Composition and Rhetoric                  | 3                     |
| Select one of the following:                    |                        |
| ENGL 203 | Writing about Literature                  | 3                     |
| ENGL 210 | Technical and Business Writing            | 3                     |
| COMM 203 | Public Speaking                           | 3                     |
| COMM 205 | Communication for Technical Professions   | 3                     |
| COMM 243 | Argumentation and Debate                  | 3                     |
| Literature in English (p. 465)                 | 6                     |
| Foreign language (p. 465)                      | 14                    |
| Mathematics (p. 22) ²                           | 6                     |
| Language, philosophy and culture (p. 23)       | 3                     |
| Creative arts (p. 24)                         | 3                     |
| Language, philosophy, and culture or creative arts (p. 23) | 3 |
| Life and physical sciences (p. 22)             | 9                     |
| Social and behavioral sciences (p. 25) ³       | 6                     |
| American history (p. 25)                      | 6                     |
| International and Cultural Diversity (p. 40) ⁴ | 3                     |
| Free electives ³                               | 22                    |

Total Semester Credit Hours: 120

¹ Students must complete this course before taking more than six hours of 300- or 400-level courses in Political Science.
² At least 3 hours must be in MATH except MATH 102, MATH 150, MATH 167, MATH 365, and MATH 366. Three hours may be PHIL 240.
³ POLS 100-POLS 499 (p. 936) cannot be used to fulfill this requirement.
Program Requirements

admitted to the Bush School's MPSA program. To complete the same two-year, 48-hour curriculum as other students at Texas A&M University for an undergraduate degree. Students will be required to take the courses required by the College of Liberal Arts and by Texas A&M University for baccalaureate degree in Political Science, as well as some prerequisites for a baccalaureate degree in Political Science, as well as completing 120 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Political Science, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree. Students will be required to complete the same two-year, 48 hour curriculum as other students admitted to the Bush School’s MPSA program.

Political Science - 5-Year Bachelor of Arts/Master of Public Service Administration

Students admitted into this program will be enrolled in Bush School graduate courses with an undergraduate classification for the fall of their fourth year and will be re-classified as degree seeking master's degree students upon completing 120 credit hours, typically in the following semester. These credit hours must include specific course prerequisites for a baccalaureate degree in Political Science, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree. Students will be required to complete the same two-year, 48 hour curriculum as other students admitted to the Bush School’s MPSA program.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 200</td>
<td>Foundations of Political Science</td>
<td>3</td>
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<td>POLS 206</td>
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</tr>
<tr>
<td>POLS 209</td>
<td>Introduction to Political Science Research ¹</td>
<td>3</td>
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<tr>
<td>Select three of the following:</td>
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<tr>
<td>POLS 203</td>
<td>Introduction to Political Theory</td>
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<tr>
<td>POLS 233</td>
<td>Politics and Policy in the United States</td>
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</tr>
<tr>
<td>Political Science electives (p. 936)</td>
<td></td>
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</table>

College and University Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td></td>
<td>6</td>
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<tr>
<td>Foreign language (p. 465)</td>
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<tr>
<td>Mathematics (p. 22) ²</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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<td>3</td>
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<tr>
<td>Creative arts (p. 24)</td>
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</tbody>
</table>

Language, philosophy, and culture or creative arts (p. 23) ³ | 3
Life and physical sciences (p. 22) ³ | 9
Social and behavioral sciences (p. 25) ³ | 6
American history (p. 25) ³ | 6
International and Cultural Diversity (p. 40) ⁴ | 4
Free electives ³ | 22
Total Semester Credit Hours | 120

¹ Students must complete this course before taking more than six hours of 300- or 400-level courses in Political Science.
² At least 3 hours must be in MATH except MATH 102, MATH 150, MATH 167, MATH 365, and MATH 366. Three hours may be PHIL 240.
³ POLS 100-POLS 499 (p. 936) cannot be used to fulfill this requirement.
⁴ Course may be used to satisfy any other requirement.

Political Science - BS

The Department of Political Science offers a Bachelor of Science in Political Science. The B.S. program emphasizes building skills in social science research and data analysis while gaining a better understanding of politics, developing habits of critical thinking, and enhancing students’ written, verbal, and visual communications skills.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 200</td>
<td>Foundations of Political Science</td>
<td>3</td>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 209</td>
<td>Introduction to Political Science Research ¹</td>
<td>3</td>
</tr>
<tr>
<td>Select three of the following:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>POLS 203</td>
<td>Introduction to Political Theory</td>
<td></td>
</tr>
<tr>
<td>POLS 229</td>
<td>Introduction to Comparative Politics</td>
<td></td>
</tr>
<tr>
<td>POLS 231</td>
<td>Introduction to World Politics</td>
<td></td>
</tr>
<tr>
<td>POLS 233</td>
<td>Politics and Policy in the United States</td>
<td></td>
</tr>
<tr>
<td>Political science electives (p. 936)</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

1. No more than 36 credits in political science may be applied to the degree. A grade of C or better is required for a course to be counted in the major field.
2. Other courses may qualify for the college and university requirements. Student should consult the approved list of courses in the Undergraduate Student Services Office in the College of Liberal Arts. No course can be counted in more than one category.
3. Course may be used to satisfy any other requirement.
Foreign language (p. 465) 8
Select one of the following: 3-4
POLS 308 Game Theoretic Methods in Political Science
STAT 307 Sample Survey Techniques
ECON 449 Economics of Decision-Making Strategy
ECON 459 Games and Economic Behavior
CSCE 110 Programming I
CSCE 111 Introduction to Computer Science Concepts and Programming
CSCE 206 Structured Programming in C

College and University Requirements
ENGL 104 Composition and Rhetoric 3
Select one of the following: 3
ENGL 203 Writing about Literature
ENGL 210 Technical and Business Writing
COMM 203 Public Speaking
COMM 205 Communication for Technical Professions
COMM 243 Argumentation and Debate

Literature in English (p. 465) 6

Mathematics
Select one of the following options: 9
Option 1:
PHEL 240 Introduction to Logic
MATH 141 Finite Mathematics
MATH 142 Business Calculus
Option 2:
PHEL 240 Introduction to Logic
MATH 151 Engineering Mathematics I
MATH 152 Engineering Mathematics II
Option 3:
PHEL 240 Introduction to Logic
MATH 171 Analytic Geometry and Calculus
MATH 172 Calculus

Creative arts (p. 24) 3
Language, philosophy and culture (p. 23) 3
Language, philosophy and culture or creative arts (p. 23) 3
Life and physical sciences (p. 22) 9
Social and behavioral sciences (p. 25) 6
American history (p. 25) 6
International and cultural diversity (p. 40) 3
Free electives 2 19

Total Semester Credit Hours 120

1 Students must complete this course before taking more than six hours of 300- or 400-level courses in Political Science.
2 POLS 100-POLS 499 (p. 936) cannot fulfill this requirement.
3 Course may be used to satisfy any other requirement.

No more than 39 credits in political science may be applied to the degree.

A grade of C or better is required for a course to be counted in the major field.

Other courses may qualify for the college and university requirements. Student should consult the approved list of courses in the Undergraduate Student Services Office in the College of Liberal Arts. No course can be counted in more than one category.

Political Science - 5-Year Bachelor of Science/Master of Public Service Administration

Students admitted into this program will be enrolled in Bush School graduate courses with an undergraduate classification for the fall of their fourth year and will be re-classified as degree seeking master’s degree students upon completing 120 credit hours, typically in the following semester. These credit hours must include all specific course prerequisites for a baccalaureate degree in Political Science, as well as the courses required by the College of Liberal Arts and by Texas A&M University for an undergraduate degree. Students will be required to complete the same two-year, 48 hour curriculum as other students admitted to the Bush School’s MPSA program.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>POLS 200</td>
<td>Foundations of Political Science</td>
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<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 209</td>
<td>Introduction to Political Science Research</td>
<td>3</td>
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</table>

Select three of the following: 9

POLS 203 Introduction to Political Theory
POLS 229 Introduction to Comparative Politics
POLS 231 Introduction to World Politics
POLS 233 Politics and Policy in the United States

Political science electives (p. 936) 15
POLS 309 Polimetrics 3
Foreign language (p. 465) 8
Select one of the following: 3-4

POLS 308 Game Theoretic Methods in Political Science
STAT 307 Sample Survey Techniques
ECON 449 Economics of Decision-Making Strategy
ECON 459 Games and Economic Behavior
CSCE 110 Programming I
CSCE 111 Introduction to Computer Science Concepts and Programming
CSCE 206 Structured Programming in C

College and University Requirements
ENGL 104 Composition and Rhetoric 3
Select one of the following: 3
ENGL 203 Writing about Literature
ENGL 210  Technical and Business Writing
COMM 203  Public Speaking
COMM 205  Communication for Technical Professions
COMM 243  Argumentation and Debate

Literature in English (p. 465)  6
Mathematics
Select one of the following options:  9
  Option 1:
  PHIL 240  Introduction to Logic
  MATH 141  Finite Mathematics
  MATH 142  Business Calculus
  Option 2:
  PHIL 240  Introduction to Logic
  MATH 151  Engineering Mathematics I
  MATH 152  Engineering Mathematics II
  Option 3:
  PHIL 240  Introduction to Logic
  MATH 171  Analytic Geometry and Calculus
  MATH 172  Calculus

Creative arts (p. 24)  3
Language, philosophy and culture (p. 23)  3
Language, philosophy and culture or creative arts (p. 23)  3
Life and physical sciences (p. 22)  9
Social and behavioral sciences (p. 25)  6
American history (p. 25)  6
International and cultural diversity (p. 40)  3
Free electives  19

Total Semester Credit Hours  120

1 Students must complete this course before taking more than six hours of 300- or 400-level courses in Political Science.
2 POLS 100-POLS 499 (p. 936) cannot fulfill this requirement.
3 Course may be used to satisfy any other requirement.

No more than 39 credits in political science may be applied to the degree. A grade of C or better is required for a course to be counted in the major field.

Other courses may qualify for the college and university requirements. Student should consult the approved list of courses in the Undergraduate Student Services Office in the College of Liberal Arts. No course can be counted in more than one category.

Students are reclassified as degree seeking master's students upon completing 120 credit hours, typically in the following semester.

See the MPSA program in the Graduate Catalog for MPSA requirements.

Department of Psychology

Psychology majors receive a rigorous program of undergraduate education and training that encourages critical thinking, lifelong learning, and the analysis and integration of information about individuals and groups of people. The curriculum leading to a degree in psychology provides students with an understanding of human behavior and the ability to use scientific methods to answer questions about human behavior. Students are prepared to enter a variety of graduate and professional programs in psychology and related fields (such as law, medical school), as well as to enter entry-level employment in a number of fields (such as business, human resources).

BA/BS Degrees: Students majoring in psychology may earn either the Bachelor of Arts or Bachelor of Science degree. The psychology course requirements for the two degrees are identical; they differ with respect to the requirements in other disciplines. For example, the BA degree requires courses in a foreign language and extra humanities hours, whereas the BS degree requires additional hours in the physical and biological sciences. The two degrees are offered to allow students to complete their non-psychology course of study in fields of greatest interest to them. Thus, students who have stronger interests in the natural and life sciences should pursue the BS degree, whereas those with stronger interests in foreign language and the humanities should pursue the BA degree.

Both degrees provide students with the necessary curriculum requirements to pursue graduate study in psychology in most institutions, as well as other professional fields such as law. Students planning to apply to medical school or other physical health professional programs are advised to select the BS degree program.

Honors: Students who qualify for the University Honors Program should contact the Department of Psychology about the department’s own honors program which places an emphasis on small classes and independent research experience.

Minors: A non-psychology minor is optional for psychology majors. If chosen, a minor must consist of 15–18 credit hours, no more than 9 of which may be lower division and must be declared before the student completes 90 credit hours. No more than 6 hours from the minor may be used to fulfill other Core requirements. A grade of C or higher is required if a course is to be counted in the major or minor field. A psychology minor is available for non-psychology majors (see below). A neuroscience minor is available to both psychology and non-psychology majors. For more information, visit the Neuroscience website (http://tamin.tamu.edu/undergrad/minor). For more information about Psychology undergraduate programs, please visit the Department of Psychology website (http://psychology.tamu.edu).

Faculty
Alexander-Packard, Gerianne, Professor
Psychology
PHD, McGill University, 1991

Anderson, Brian A, Assistant Professor
Psychology
PHD, Johns Hopkins University, 2014

Arthur, Winfred E, Professor
Psychology
PHD, The University of Akron, 1988

Balsis, Stephen M, Associate Professor
Psychology
PHD, Washington University in St. Louis, 2008

Barnhardt, Terrence M, Instructional Associate Professor
Psychology
PHD, The University of Arizona, 1993
Bergman, Mindy E, Professor
Psychology
PHD, University of Illinois at Urbana-Champaign, 2001

Bernard, Jessica A, Assistant Professor
Psychology
PHD, University of Michigan, 2012

Bodden, Jack L, Lecturer
Psychology
PHD, The Ohio State University, 1969

Bolanos, Carlos A, Associate Professor
Psychology
PHD, Northeastern University, 2000

Bolger, Patrick A, Instructional Assistant Professor
Psychology
PHD, University of Arizona, 2016

Brooker, Rebecca, Assistant Professor
Psychology
PHD, The Pennsylvania State University, 2011

Carter Sowell, Adrienne R, Associate Professor
Psychology
PHD, Purdue University, 2010

Dawson Mathur, Vani A, Assistant Professor
Psychology
PHD, Northwestern University, 2012

Donnellan, Michael B, Professor
Psychology
PHD, University of California, Davis, 2001

Edens, John F, Professor
Psychology
PHD, Texas A&M University, 1996

Edens, Pamela S, Lecturer
Psychology
PHD, Texas A&M University, 1997

Eitan, Shoshana, Associate Professor
Psychology
PHD, Weizmann Institute of Science, 1997

Fields, Sherecce A, Associate Professor
Psychology
PHD, University of South Florida, 2008

Geraci, Lisa D, Professor
Psychology
PHD, State University of New York at Stony Brook, 2001

Grau, James W, Professor
Psychology
PHD, University of Pennsylvania, 1985

Heffer, Robert W, Clinical Professor
Psychology
PHD, Louisiana State University, 1988

Hicks, Joshua A, Associate Professor
Psychology
PHD, University of Missouri - Columbia, 2009

Lench, Heather C, Associate Professor
Psychology
PHD, University of California, Irvine, 2007

Leunes, Arnold D, Senior Professor
Psychology
EDD, North Texas State College, 1969

MacNamara, Annmarie E, Assistant Professor
Psychology
PHD, Stony Brook University, 2013
MFA, Glasgow School of Art, 2006

Maren, Stephen A, Professor
Psychology
PHD, University of Southern California, 1993

Meagher, Mary W, Professor
Psychology
PHD, University of North Carolina at Chapel Hill, 1989

Miner, Kathi N, Associate Professor
Psychology
PHD, University of Michigan, 2004

Morey, Leslie C, Professor
Psychology
PHD, University of Florida, 1981

Moscarello, Justin M, Assistant Professor
Psychology
PHD, University of California, Santa Barbara, 2010

Nagaya, Naomi, Research Assistant Professor
Psychology
PHD, University of Southern California, 1993

Orr, Joseph M, Assistant Professor
Psychology
PHD, University of Michigan, 2011

Packard, Mark G, Professor
Psychology
PHD, McGill University, 1991

Payne, Stephanie C, Professor
Psychology
PHD, George Mason University, 2000

Rholes, William S, Professor
Psychology
PHD, Princeton University, 1978

Sabat, Isaac E, Assistant Professor
Psychology
PHD, George Mason University, 2016

Salter, Phia S, Associate Professor
Psychology
PHD, University of Kansas, 2010
Samuelson, Charles D, Associate Professor
Psychology
PHD, University of California, Santa Barbara, 1986

Schlegel, Rebecca J, Associate Professor
Psychology
PHD, University of Missouri - Columbia, 2009

Schmeichel, Brandon J, Professor
Psychology
PHD, Florida State University, 2005

Schumacher, Jay S, Lecturer
Psychology
PHD, Texas A&M University, 1999

Smallman, Rachel E, Assistant Professor
Psychology
PHD, University of Illinois at Urbana-Champaign, 2010

Smith, Rachel J, Assistant Professor
Psychology
PHD, University of Pennsylvania, 2008

Smith, Steven M, Professor
Psychology
PHD, University of Wisconsin - Madison, 1979

Snyder, Douglas K, Professor
Psychology
PHD, University of North Carolina at Chapel Hill, 1978

Stagner, Brian H, Clinical Professor
Psychology
PHD, University of Massachusetts Amherst, 1982

Vaid, Jyotsna, Professor
Psychology
PHD, McGill University, 1982

Van Widenfelt, Brigit M, Clinical Assistant Professor
Psychology
PHD, The Catholic University of America, 1995

Vess, Matthew, Professor
Psychology
PHD, University of Missouri - Columbia, 2010

Wellman, Paul J, Professor
Psychology
PHD, Iowa State University, 1980

Wilcox, Teresa G, Professor
Psychology
PHD, The University of Arizona, 1993

Worthy, Darrell A, Associate Professor
Psychology
PHD, The University of Texas at Austin, 2010

Yamauchi, Takashi, Associate Professor
Psychology
PHD, Columbia University, 1997

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**Majors**

- Bachelor of Arts in Psychology (p. 550)
- Bachelor of Science in Psychology (p. 551)

**Minors**

- Psychology Minor (p. 552)

**Certificates**

- Applied Behavioral Health Certificate (p. 552)
- Healthy Development Certificate (p. 553)
- Psychology of Diversity Certificate (p. 553)
- Work and Organizations Certificate (p. 553)

---

**Psychology - BA**

The Department of Psychology offers a Bachelor of Arts in Psychology. Students interested in studying human behavior, with a humanities-oriented supporting curriculum, would pursue a BA degree. The BA can successfully prepare students interested in graduate and professional programs that stress a humanities background (e.g., counseling, social work, management, law), as well as students interested in employment in business or applied psychology.

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**Program Requirements**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology</td>
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<tr>
<td>PSYC 301</td>
<td>Elementary Statistics for Psychology</td>
<td>4</td>
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<tr>
<td>PSYC 302</td>
<td>Research Methods and Design in Psychology</td>
<td>4</td>
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<td>PSYC 306</td>
<td>Abnormal Psychology</td>
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<td>PSYC 307</td>
<td>Developmental Psychology</td>
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<tr>
<td>PSYC 315</td>
<td>Social Psychology</td>
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<tr>
<td>PSYC 319</td>
<td>History and Systems of Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 330</td>
<td>Personality</td>
<td></td>
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<tr>
<td>PSYC 352</td>
<td>Organizational Psychology</td>
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Select two of the following:

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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>PSYC 311/ NRSC 311</td>
<td>Psychology of Animal Behavior</td>
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<tr>
<td>PSYC 320/ NRSC 320</td>
<td>Sensation-Perception</td>
<td></td>
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<tr>
<td>PSYC 333/ NRSC 333</td>
<td>Biology of Psychological Disorders</td>
<td></td>
</tr>
<tr>
<td>PSYC 335/ NRSC 335</td>
<td>Physiological Psychology</td>
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<tr>
<td>PSYC 340/ NRSC 340</td>
<td>Psychology of Learning</td>
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<tr>
<td>PSYC 345</td>
<td>Human Cognitive Processes</td>
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Select one of the following:

<table>
<thead>
<tr>
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<th>Title</th>
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<tr>
<td>PSYC 206/ AFST 206</td>
<td>Black Psychology</td>
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</tr>
<tr>
<td>PSYC 208/ AFST 208</td>
<td>Stereotypes, Prejudice, and Minority</td>
<td></td>
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</tbody>
</table>
PSYC 209/AFST 209  Psychology of Culture and Diversity
PSYC 210/WGST 210  Psychological Aspects of Human Sexuality
PSYC 300/WGST 300  Psychology of Women
PSYC 303  Psychology of Women of Color
PSYC 432  Diversity and Inclusion in Organizations

Psychology electives (p. 943) 3

College and University Requirements
ENGL 104  Composition and Rhetoric 3
ENGL 210  Technical and Business Writing 3
or ENGL 203  or Writing about Literature
Foreign Language (p. 465) 14
Select two of the following: 4 6
Select one from the following:
MATH 141  Finite Mathematics
MATH 140  Mathematics for Business and Social Sciences
MATH 166  Topics in Contemporary Mathematics II
Select one from the following:
MATH 142  Business Calculus
MATH 131  Mathematical Concepts—Calculus
MATH 147  Calculus I for Biological Sciences
MATH 151  Engineering Mathematics I
MATH 171  Analytic Geometry and Calculus
Select one from the following:
MATH 152  Engineering Mathematics II
MATH 148  Calculus II for Biological Sciences
MATH 172  Calculus
Select from the following:
MATH 150  Functions, Trigonometry and Linear Systems
Select from the following:
PHIL 240  Introduction to Logic
Literature in English (p. 465) 6
Language, philosophy and culture and Creative arts (p. 465) 12
Social and behavioral science (p. 25) 5 6
Life and physical sciences (p. 22) 9
American history (p. 25) 6
POLS 206  American National Government 3
POLS 207  State and Local Government 3
International and cultural diversity (p. 40) 6
Electives 7,8 14

Total Semester Credit Hours 120

1  Enrollment freshman year is strongly recommended.
2  Enrollment sophomore year is strongly recommended.
3  No more than a combined maximum of 6 hours of PSYC 484, PSYC 485, or PSYC 485H are permitted.

4  Courses must have KMTH attribute. Note that MATH 167 is not an accepted KMTH course in this degree program.
5  Courses in psychology may not be used to satisfy this requirement.
6  Course may be used to satisfy any other requirement.
7  No more than 9 hours of any combination of military science, naval science, aerospace studies and physical activity may be counted. A minor field of study may fulfill this requirement, but a minor is not required.
8  Up to 6 hours in PSYC 100-499 are permitted.

A grade of C or higher is required if a course is to be counted in the major field. A student must complete a minimum of 36 hours of 300- and 400-level courses at Texas A&M.

No course can be counted in more than one category.

A non-psychology minor is optional for psychology majors. If chosen, a minor must consist of 15–18 credit hours, no more than 9 of which may be lower division and must be declared before the student completes 90 credit hours. No more than 6 hours from the minor may be used to fulfill other Core requirements. A grade of C or higher is required if a course is to be counted in the major or minor field.

Psychology - BS

The Department of Psychology offers a Bachelor of Science in Psychology. Students interested in studying human behavior, with a science-oriented supporting curriculum, would pursue a BS degree. The BS can successfully prepare students interested in further study in a science-oriented psychology graduate program (such as neuroscience) or medical school, or other health-related graduate and professional programs (e.g., pharmacy, physical therapy), as well as students interested in entry-level positions in business or applied psychology.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology 1</td>
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<tr>
<td>PSYC 301</td>
<td>Elementary Statistics for Psychology 2</td>
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<td>PSYC 302</td>
<td>Research Methods and Design in Psychology 2</td>
<td>4</td>
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<td>PSYC 306</td>
<td>Abnormal Psychology</td>
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<td>PSYC 352</td>
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<tr>
<td>PSYC 311</td>
<td>Psychology of Animal Behavior</td>
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<td>NRSC 311</td>
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<td>PSYC 320</td>
<td>Sensation-Perception</td>
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<td>PSYC 333</td>
<td>Biology of Psychological Disorders</td>
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<td>NRSC 333</td>
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<td>PSYC 335</td>
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Psychology - Minor

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<td>NRSC 340</td>
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<td>PSYC 345</td>
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<td>Black Psychology</td>
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<td>AFST 206</td>
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<td></td>
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<tr>
<td>PSYC 208</td>
<td>Stereotypes, Prejudice, and Minority</td>
<td></td>
</tr>
<tr>
<td>AFST 208</td>
<td>Experience</td>
<td></td>
</tr>
<tr>
<td>PSYC 209</td>
<td>Psychology of Culture and Diversity</td>
<td></td>
</tr>
<tr>
<td>AFST 209</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSYC 210</td>
<td>Psychological Aspects of Human</td>
<td></td>
</tr>
<tr>
<td>WGST 210</td>
<td>Sexuality</td>
<td></td>
</tr>
<tr>
<td>PSYC 300</td>
<td>Psychology of Women</td>
<td></td>
</tr>
<tr>
<td>WGST 300</td>
<td></td>
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</tr>
<tr>
<td>PSYC 303</td>
<td>Psychology of Women of Color</td>
<td></td>
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<tr>
<td>PSYC 432</td>
<td>Diversity and Inclusion in Organizations</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>(p. 943)</td>
<td>3</td>
</tr>
<tr>
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</tbody>
</table>

**College and University Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or ENGL 203 or Writing about Literature</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Select two of the following:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Select one from the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 141   Finite Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 140   Mathematics for Business and Social Sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 166   Topics in Contemporary Mathematics II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one from the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 142   Business Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 131   Mathematical Concepts—Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 147   Calculus I for Biological Sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 151   Engineering Mathematics I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 171   Analytic Geometry and Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one from the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 152   Engineering Mathematics II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 148   Calculus II for Biological Sciences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 172   Calculus</td>
<td></td>
</tr>
<tr>
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<td>Select from the following:</td>
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</tr>
<tr>
<td></td>
<td>MATH 150   Functions, Trigonometry and Linear Systems</td>
<td></td>
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<tr>
<td></td>
<td>Select from the following:</td>
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</tr>
<tr>
<td></td>
<td>PHIL 240   Introduction to Logic</td>
<td></td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Language, philosophy and culture and Creative arts (p. 465)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Social and behavioral science (p. 25)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>International and cultural diversity (p. 40)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
</tbody>
</table>

**Psychology - Minor**

A Psychology minor is available for non-psychology majors. The minor must be declared before the student has completed 90 credit hours.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 200 to 499 (p. 943)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PSYC 300 to 499 (p. 943)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

1. Only 3 total hours from PSYC 484, PSYC 485 and PSYC 491 can count toward the minor.
2. Registration in PSYC 301 and PSYC 302 is limited to PSYC majors only.

At least 9 semester credit hours of PSYC courses above the 200-level must be taken at Texas A&M.

Students must make a grade of "C" or better in all courses.

**Applied Behavioral Health - Certificate**

**Overview**

The Department of Psychology offers an Applied Behavioral Health Certificate.
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 306</td>
<td>Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 307</td>
<td>Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select three of the following:</td>
<td>9</td>
</tr>
<tr>
<td>PSYC 305</td>
<td>Psychology of Adjustment</td>
<td></td>
</tr>
<tr>
<td>PSYC 336/ NRSC 336</td>
<td>Drugs and Behavior</td>
<td></td>
</tr>
<tr>
<td>PSYC 360/ NRSC 360</td>
<td>Health Psychology and Behavioral Medicine</td>
<td></td>
</tr>
<tr>
<td>PSYC 414</td>
<td>Behavior Principles</td>
<td></td>
</tr>
<tr>
<td>PSYC 450</td>
<td>Clinical Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 470</td>
<td>Psychological Testing and Measurement</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

Students must earn an average grade of "B" or better across certificate courses.

Healthy Development - Certificate Overview

The Department of Psychology offers a Healthy Development Certificate.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 307</td>
<td>Developmental Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 315</td>
<td>Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select two of the following:</td>
<td>6</td>
</tr>
<tr>
<td>PSYC 323</td>
<td>Psychology of Adolescence</td>
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</tr>
<tr>
<td>PSYC 365</td>
<td>Psychology of Aging</td>
<td></td>
</tr>
<tr>
<td>PSYC 407</td>
<td>Behavioral Disorders of Children</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 305</td>
<td>Psychology of Adjustment</td>
<td></td>
</tr>
<tr>
<td>PSYC 414</td>
<td>Behavior Principles</td>
<td></td>
</tr>
<tr>
<td>PSYC 450</td>
<td>Clinical Psychology</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 15

Students must earn an average grade of "B" or better across certificate courses.

Psychology of Diversity - Certificate Overview

The Department of Psychology offers a Psychology of Diversity Certificate.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 315</td>
<td>Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 330</td>
<td>Personality</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select three of the following:</td>
<td>9</td>
</tr>
<tr>
<td>PSYC 304</td>
<td>Psychology of Sport and Physical Activity</td>
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</tr>
<tr>
<td>PSYC 352</td>
<td>Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 353</td>
<td>Personnel Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 354</td>
<td>Conflict and Negotiation</td>
<td></td>
</tr>
<tr>
<td>PSYC 432</td>
<td>Diversity and Inclusion in Organizations</td>
<td></td>
</tr>
<tr>
<td>PSYC 470</td>
<td>Psychological Testing and Measurement</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

Students must earn an average grade of "B" or better across certificate courses.

Work and Organizations - Certificate Overview

The Department of Psychology offers a Work and Organizations Certificate.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 315</td>
<td>Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 330</td>
<td>Personality</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select three of the following:</td>
<td>9</td>
</tr>
<tr>
<td>PSYC 304</td>
<td>Psychology of Sport and Physical Activity</td>
<td></td>
</tr>
<tr>
<td>PSYC 352</td>
<td>Organizational Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 353</td>
<td>Personnel Psychology</td>
<td></td>
</tr>
<tr>
<td>PSYC 354</td>
<td>Conflict and Negotiation</td>
<td></td>
</tr>
<tr>
<td>PSYC 432</td>
<td>Diversity and Inclusion in Organizations</td>
<td></td>
</tr>
<tr>
<td>PSYC 470</td>
<td>Psychological Testing and Measurement</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

Students must earn an average grade of "B" or better across certificate courses.

Department of Sociology

The Department of Sociology supports a diverse community of faculty, staff and students working together to research and address real world social issues and problems. Faculty offer courses in race and ethnicity, social class, gender, popular culture, social psychology, organizations, community, environment, criminology, religion, global sociology, medical sociology, demography, and gerontology, among others. Some courses include hands-on service-learning opportunities in which students connect service and/or research in the community with course material. To further complement our courses in these and other areas of sociology, students have opportunities to work one-on-one with professors engaged...
in sociological research. For sociology majors seeking to enter applied fields, we have a highly praised internship program that offers practical experience in community nonprofit organizations, government agencies, and businesses.

Sociological training prepares students for graduate school and/or employment in a variety of occupations. Employers increasingly look for job candidates to have the critical thinking, writing, and research skills students will develop in our program. Sociology coursework provides students with the ability to live and work effectively in a diverse and global society by better understanding social diversity, cultural trends, inequalities, organizational behavior, and community and world events. Sociology provides an excellent background for students wishing to enter into the helping professions like social services, ministry, nursing, teaching, and law enforcement, and it provides an outstanding foundation for law, marketing, human resources, journalism, government, business management, and entrepreneurialism.

Faculty

Amaral, Ernesto, Assistant Professor
Sociology
PHD, The University of Texas at Austin, 2007

Burk, James S, Professor Emeritus
Sociology
PHD, University of Chicago, 1982

Campbell, Mary E, Associate Professor
Sociology
PHD, University of Wisconsin - Madison, 2004

Cohn, Samuel R, Professor
Sociology
PHD, University of Michigan, 1981

Dietrich, Katheryn A, Instructional Associate Professor
Sociology
PHD, Texas A&M University, 1994

Eason, John M, Associate Professor
Sociology
PHD, University of Chicago, 2008

Feagin, Joe R, Professor
Sociology
PHD, Harvard University, 1966

Fossett, Mark A, Professor
Sociology
PHD, The University of Texas at Austin, 1983

Foster, Holly A, Professor
Sociology
PHD, University of Toronto, 2001

Gatson, Sarah N, Associate Professor
Sociology
PHD, Northwestern University, 1999

Goldsmith, Patrick A, Associate Professor
Sociology
PHD, University Of Arizona, 1999

Hernandez, Alexander A, Instructional Assistant Professor
Sociology
PHD, Boston College, 2014

Howard, Daniel L, Professor
Sociology
PHD, Vanderbilt University, 1992

Jewell, Joseph O, Associate Professor
Sociology
PHD, University of California, Los Angeles, 1998

Keith, Verna M, Professor
Sociology
PHD, University of Kentucky, 1982

Lakkimsetti, Chaitanya, Assistant Professor
Sociology
PHD, University of Wisconsin - Madison, 2010

Linneman, Judith A, Instructional Associate Professor
Sociology
PHD, Iowa State University, 1985

Mackin, Robert S, Instructional Associate Professor
Sociology
PHD, University of Wisconsin - Madison, 1998

May, Reuben A, Professor
Sociology
PHD, University of Chicago, 1996

McIntosh, William A, Professor
Sociology
PHD, Iowa State University, 1975

Mestrovic, Stjepan G, Professor
Sociology
PHD, Syracuse University, 1982

Moore, Wendy A, Associate Professor
Sociology
PHD, University of Minnesota, Twin Cities, 2005

Morris, Theresa M, Associate Professor
Sociology
PHD, Texas A&M University, 2000

Murguia, Edward, Professor
Sociology
PHD, The University of Texas at Austin, 1978

Pals, Heili, Assistant Professor
Sociology
PHD, Stanford University, 2006

Plankey Videla, Nancy B, Associate Professor
Sociology
PHD, University of Wisconsin - Madison, 1998

Poston, Dudley L, Senior Professor
Sociology
PHD, University of Oregon, 1968
Prechel, Harland N, Professor
Sociology
PHD, University of Kansas, 1986

Sakamoto, Arthur, Professor
Sociology
PHD, University of Wisconsin - Madison, 1988

Sell, Jane A, Professor
Sociology
PHD, Washington State University, 1979

Suzuki, Kazuko, Associate Professor
Sociology
PHD, Princeton University, 2003

Thornton, Patricia H, Professor
Sociology
PHD, Stanford University, 1993

Waren, Warren P, Instructional Assistant Professor
Sociology
PHD, Texas A&M University, 2008

Woods, Timothy S, Instructional Associate Professor
Sociology
PHD, Texas A&M University, 2000

Majors
- Bachelor of Arts in Sociology (p. 555)
- Bachelor of Arts in Sociology and Master of Public Service and Administration, 5-Year Degree Program (p. 556)
- Bachelor of Science in Sociology (p. 557)
- Bachelor of Science in Sociology and Master of Public Service and Administration, 5-Year Degree Program (p. 557)

Minors
- Latino/a and Mexican-American Studies Minor (p. 559)
- Sociology Minor (p. 559)

Sociology - BA

The Department of Sociology offers a Bachelor of Arts in Sociology.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI 205</td>
<td>Introduction to Sociology ¹</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 220</td>
<td>Methods of Social Research ¹</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 230</td>
<td>Classical Sociological Theory ¹</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 420</td>
<td>Advanced Methods of Social Research ¹</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 430</td>
<td>Contemporary Sociological Theory ¹</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 100-499 (p. 960) ¹</td>
<td></td>
<td>18</td>
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</table>

College and University Requirements

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric ¹</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:
- ENGL 203 Writing about Literature
- ENGL 210 Technical and Business Writing

Other courses may qualify. Consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors.

Please note that university requirements specify that all students must take at least two courses in their major that are designated as fulfilling a writing requirement (W). See the section on general requirements for baccalaureate degrees for more information.

Minor Field of Study

Sociology majors are not required to select a minor field of study, if chosen, the minor must consist of 15-18 hours, with no more than 9 hours taken at a 100- or 200-level. No more than six hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted in the minor field.

Non-Sociology Majors To Teach Sociology

Students desiring certification to teach sociology in Texas secondary schools must complete a social studies composite with a sociology emphasis and required education courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric ¹</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:
- ENGL 203 Writing about Literature
- ENGL 210 Technical and Business Writing

Teacher Certification

Sociology (p. 960)
Political Science (p. 936)
Economics (p. 786)
Geography (p. 822)
History (p. 835) 18
Total Semester Credit Hours 76

Sociology Majors To Teach Sociology
Sociology majors desiring certification must include the following among their sociology courses and required education courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOCI 317/ AFST 317 Racial and Ethnic Relations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SOCI 323/ AFST 323 Sociology of African Americans</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SOCI 403 Sociology of Latinos</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SOCI 316/ WGST 316 Sociology of Gender</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOCI 424/ WGST 424 Women and Work in Society</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>SOCI 411 Social Psychology</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 6

Education Courses
More complete information on requests for teacher certification may be found in the College of Education and Human Development section under secondary certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTC 345</td>
<td>Microcomputer Awareness for Educators</td>
<td>3</td>
</tr>
<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 322</td>
<td>Teaching and Schooling in Modern Society</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 323</td>
<td>Teaching Skills I</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 324</td>
<td>Teaching Skills II</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 401</td>
<td>Language Arts in the Middle and Senior School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 404</td>
<td>Social Studies in the Middle and Senior High School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 406</td>
<td>Science in the Middle and Secondary School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 407</td>
<td>Mathematics in the Middle and Senior School</td>
<td>3</td>
</tr>
<tr>
<td>TEFB 426</td>
<td>Supervised Clinical Teaching</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 36

Students should consult an undergraduate Sociology advisor as early as possible to review the requirements of the social studies composite.

Sociology - 5-Year Bachelor of Arts/Master of Public Service Administration
The Department of Sociology and The Bush School of Government & Public Service offer a five year degree program leading to a Bachelor of Arts in Sociology and a Master of Public Service Administration.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI 205</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 220</td>
<td>Methods of Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 230</td>
<td>Classical Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 420</td>
<td>Advanced Methods of Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 430</td>
<td>Contemporary Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>BUSH 631</td>
<td>Quantitative Methods in Public Management I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one from:</td>
<td>3</td>
</tr>
<tr>
<td>BUSH 632</td>
<td>Quantitative Methods in Public Management II</td>
<td></td>
</tr>
<tr>
<td>BUSH 635</td>
<td>Quantitative Methods in Public Management II: Policy Analysis Emphasis</td>
<td>3</td>
</tr>
<tr>
<td>PSAA 630</td>
<td>Program Evaluation in Public and Nonprofit Organizations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select from the following:</td>
<td>9</td>
</tr>
<tr>
<td>SOCI 100-499 (p. 960)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI 608</td>
<td>Social Organization</td>
<td></td>
</tr>
<tr>
<td>PSAA elective or track requirement</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

College and University Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Literature in English (p. 465)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Foreign language (p. 465)</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Mathematics (p. 885)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences (p. 22)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Creative arts (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Language, philosophy and culture or Creative arts (p. 23)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral science (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
<td>6</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International and cultural diversity (p. 40)</td>
<td>3</td>
</tr>
</tbody>
</table>
General electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSAA 601</td>
<td>Foundations of Public Service</td>
<td>3</td>
</tr>
<tr>
<td>PSAA 611</td>
<td>Public Policy Formation</td>
<td>3</td>
</tr>
<tr>
<td>PSAA 621</td>
<td>Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

1. A grade of C or better is required for credit.
2. SOCI courses do not count toward fulfilling this requirement.
3. Course may be used to satisfy any other requirement.
4. Any 100-499 level course may be taken. No more than 3 hours of SOCI 484 may be used toward fulfilling this requirement.

No more than 33 hours in sociology may be applied to the major.

Other courses may qualify. Consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors. No more than one course may be counted in more than one category.

Please note that university requirements specify that all students must take at least two courses in their major that are designated as fulfilling a writing requirement (W). See the section on general requirements for baccalaureate degrees for more information.

**Minor Field of Study**

Sociology majors are not required to select a minor field of study. If chosen, the minor must consist of 15-18 hours, with no more than 9 hours taken at a 100- or 200-level. No more than six hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted in the minor field.

---

**Sociology - BS**

The Department of Sociology offers a Bachelor of Science in Sociology.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI 205</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 220</td>
<td>Methods of Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 230</td>
<td>Classical Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 420</td>
<td>Advanced Methods of Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 430</td>
<td>Contemporary Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 100-499 (p. 960)</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td><strong>College and University Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (p. 885)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

1. A grade of C or better is required for credit.
2. SOCI courses do not count toward fulfilling this requirement.
3. Course may be used to satisfy any other requirement.
4. No more than 6 semester credit hours for SOCI 484 may be applied to the Bachelor of Science degree in Sociology.

No more than 33 hours in sociology may be applied to the major.

Other courses may qualify. Consult the approved list of courses available in the Undergraduate Student Services Office in the College of Liberal Arts or from departmental advisors. No more than one course may be counted in more than one category.

Please note that university requirements specify that all students must take at least two courses in their major that are designated as fulfilling a writing intensive requirement (W). See the section on general requirements for baccalaureate degree for more information.

**Minor Field of Study**

Sociology majors are not required to select a minor field of study. If chosen, the minor must consist of 15-18 hours, with no more than 9 hours taken at a 100- or 200-level. No more than six hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted in the minor field.

---

**Sociology - 5-Year Bachelor of Science/Master of Public Service Administration**

The Department of Sociology and The Bush School of Government & Public Service offer a five year degree program leading to a Bachelor of Science in Sociology and a Master of Public Service Administration.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI 205</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 220</td>
<td>Methods of Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 230</td>
<td>Classical Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 420</td>
<td>Advanced Methods of Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 430</td>
<td>Contemporary Sociological Theory</td>
<td>3</td>
</tr>
<tr>
<td><strong>College and University Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select from the following:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (p. 885)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

1. A grade of C or better is required for credit.
2. SOCI courses do not count toward fulfilling this requirement.
3. Course may be used to satisfy any other requirement.
4. No more than 6 semester credit hours for SOCI 484 may be applied to the Bachelor of Science degree in Sociology.
Sociology majors are required to take the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI 100-499 (p. 960)</td>
<td>Social Organization</td>
<td></td>
</tr>
<tr>
<td>SOCI 608</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUSH 631</td>
<td>Quantitative Methods in Public Management I</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
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<td></td>
</tr>
<tr>
<td>BUSH 632</td>
<td>Quantitative Methods in Public Management II</td>
<td>3</td>
</tr>
<tr>
<td>BUSH 635</td>
<td>Quantitative Methods in Public Management II: Policy Analysis Emphasis</td>
<td>1</td>
</tr>
<tr>
<td>PSAA 630</td>
<td>Program Evaluation in Public and Nonprofit Organizations</td>
<td>1</td>
</tr>
</tbody>
</table>

Approved PSAA elective or track requirement | 3

College and University Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td></td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td></td>
</tr>
<tr>
<td>Literature in English (p. 465)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (p. 885)</td>
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</tr>
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<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture or Creative arts (p. 23)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>International and cultural diversity (p. 40)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>PSAA 601</td>
<td>Foundations of Public Service</td>
<td>3</td>
</tr>
<tr>
<td>PSAA 611</td>
<td>Public Policy Formation</td>
<td>3</td>
</tr>
<tr>
<td>PSAA 621</td>
<td>Economic Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours | 120

1. A grade of C or better is required for credit.
2. SOCI courses do not count toward fulfilling this requirement.
3. Courses may be used to satisfy any other requirement.
4. No more than 6 credit hours of SOCI 484 may count toward this requirement.

Minor Field of Study

Sociology majors are not required to select a minor field of study. If chosen, the minor must consist of 15-18 hours, with no more than 9 hours taken at a 100- or 200-level. No more than six hours from the minor may be used to fulfill other requirements. A grade of C or higher is required if a course is to be counted in the minor field.

Teacher Certification

Non-Sociology Majors To Teach Sociology

Students desiring certification to teach sociology in Texas secondary schools must complete a social studies composite with a sociology emphasis and required education courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI</td>
<td>Racial and Ethnic Relations (p. 960)</td>
<td>3</td>
</tr>
<tr>
<td>AFST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Sociology of African Americans (p. 936)</td>
<td>9</td>
</tr>
<tr>
<td>AFST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Sociology of Latinos (p. 786)</td>
<td>6</td>
</tr>
<tr>
<td>WGST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Women and Work in Society (p. 822)</td>
<td>10</td>
</tr>
<tr>
<td>WGST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Social Psychology (p. 835)</td>
<td>18</td>
</tr>
<tr>
<td>WGST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>76</td>
</tr>
</tbody>
</table>

Sociology Majors To Teach Sociology

Sociology majors desiring certification must include the following among their sociology courses and required education courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI</td>
<td>Racial and Ethnic Relations</td>
<td>3</td>
</tr>
<tr>
<td>AFST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Sociology of African Americans</td>
<td>3</td>
</tr>
<tr>
<td>AFST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Sociology of Latinos</td>
<td>3</td>
</tr>
<tr>
<td>WGST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Women and Work in Society</td>
<td>3</td>
</tr>
<tr>
<td>WGST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCI</td>
<td>Social Psychology</td>
<td>6</td>
</tr>
</tbody>
</table>

| Total Semester Credit Hours |                                          | 12                     |

Education Courses

More complete information on requests for teacher certification may be found in the College of Education and Human Development section under secondary certification.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTC</td>
<td>Microcomputer Awareness for Educators</td>
<td>3</td>
</tr>
<tr>
<td>INST</td>
<td>Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>COMM</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
</tbody>
</table>
Students should consult an undergraduate Sociology advisor as early as possible to review the requirements of the social studies composite.

**Latino/a and Mexican-American Studies - Minor**

The Latino/a and Mexican American Studies (or LMAS) minor at Texas A&M University invites students to investigate the experiences and contributions of Latino/as in the United States and abroad. Students minoring in LMAS will receive instruction from interdisciplinary faculty across the colleges in the areas of History, Sociology, English, Anthropology, Psychology, Communications, Political Science, Health, Geography, Education, and Hispanic studies.

The courses provide students with a broad knowledge about Latinos frequently omitted from the common curriculum, centered in the experiences of Latinos, and which provides an important pathway to multiple career choices.

Topics covered in courses include race/ethnicity, gender, politics, religion, education, and labor as well as major historical events like the Chicano and Puerto Rican civil rights movements and the social and demographic changes brought on by continued immigration.

**Career Options**

The LMAS minor can be a critical addition to a student’s career opportunities in occupations in the public or private sectors as employers desire applicants with intercultural competence.

In addition, the minor demonstrates knowledge in a growing specialty area which is attractive to graduate programs in areas including but not limited to Business Administration, Media/Journalism, History, Public Health, Psychology, and Sociology.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 362/ HISP 362</td>
<td>Latino/a Literature</td>
<td>6</td>
</tr>
<tr>
<td>HISP 363</td>
<td>Borderlands: U.S. and Mexico</td>
<td></td>
</tr>
<tr>
<td>HIST 307</td>
<td>Latino Communities of the U.S.</td>
<td></td>
</tr>
</tbody>
</table>

Select the remaining hours from the following: ²

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFST 325</td>
<td>Africana Humanities</td>
</tr>
<tr>
<td>ANTH 303</td>
<td>Archaeology of the American Southwest</td>
</tr>
<tr>
<td>COMM 407</td>
<td>Women, Minorities and the Mass Media</td>
</tr>
<tr>
<td>GEOG 323</td>
<td>Geography of Latin America</td>
</tr>
<tr>
<td>HISP 204</td>
<td>Spanish and Spanish American Literature in Translation</td>
</tr>
<tr>
<td>HIST 258</td>
<td>American Indian History</td>
</tr>
<tr>
<td>HIST 304</td>
<td>Mexican-American Frontier to 1848</td>
</tr>
<tr>
<td>HIST 305</td>
<td>Mexican-American History 1848-Present</td>
</tr>
<tr>
<td>HLTH 236</td>
<td>Race, Ethnicity and Health</td>
</tr>
<tr>
<td>PHIL 283</td>
<td>Latin American Philosophy</td>
</tr>
<tr>
<td>POLS 306</td>
<td>Contemporary Political Problems and Issues</td>
</tr>
<tr>
<td>POLS 362</td>
<td>Latin American Political Thought</td>
</tr>
<tr>
<td>PSYC 208/ AFST 208</td>
<td>Stereotypes, Prejudice, and Minority Experience</td>
</tr>
<tr>
<td>PSYC 209/ AFST 209</td>
<td>Psychology of Culture and Diversity</td>
</tr>
<tr>
<td>PSYC 303</td>
<td>Psychology of Women of Color</td>
</tr>
<tr>
<td>SOCI 203</td>
<td>U.S.-Mexico Border</td>
</tr>
<tr>
<td>SOCI 217</td>
<td>Introduction to Race and Ethnicity</td>
</tr>
<tr>
<td>SOCI 337</td>
<td>International Migration</td>
</tr>
<tr>
<td>SOCI 402</td>
<td>Sociology of Latin America</td>
</tr>
<tr>
<td>SPAN 450</td>
<td>Contemporary Spanish and Spanish-American Literature</td>
</tr>
<tr>
<td>TEFB 273</td>
<td>Introduction to Culture, Community, Society and Schools</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 12

1 The two courses (6 hours) from the first area must come from two departments.

2 Students will select 18 hours total from both lists with a minimum of 9 hours at the upper-division level (300- and 400-level).

Students must earn a C or higher in each course to be counted in the minor field.

**Sociology - Minor**

The Department of Sociology offers a minor in Sociology.
Students would be exposed to experiential learning through classes that different types of media with frequent updates and differing audiences. A component in the changing world of journalism that relies on writing for coursework would emphasize critical thinking skills—a necessary be prepared for a successful life and career in several ways. Their Students with a degree in University Studies - Journalism would substantially broadening the interdisciplinary aspects of journalism minor within the College of Liberal Arts and another outside the college, University Studies degree, students in the program are required to have a 21st century. In addition to the concentration in journalism through the concentration) and electives from other disciplines that complement an interdisciplinary approach to journalism education, with an emphasis Students must make a grade of “C” or better in all courses.

At least nine hours must be at the 300- or 400-level.

University Studies Programs

The College of Liberal Arts offers degrees in University Studies. A University Studies degree differs from a traditional “major” in that it consists of a concentration and two minors of 15-18 hours each. At least one minor must be outside the college. The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

No student in any Liberal Arts University Studies concentration may pursue a double major or a double degree.

Majors

• Bachelor of Arts in University Studies, Journalism Concentration (p. 560)
• Bachelor of Arts in University Studies, Race, Gender, Ethnicity Concentration (p. 561)
• Bachelor of Arts in University Studies, Religious Thought, Practices and Cultures Concentration (p. 563)
• Bachelor of Arts in University Studies, Society, Ethics and Law Concentration (p. 564)
• Bachelor of Science in University Studies, Health Humanities Concentration (p. 565)
• Bachelor of Science in University Studies, Liberal Arts Concentration (p. 566)
• Bachelor of Science in University Studies, Race, Gender, Ethnicity Concentration (p. 567)

University Studies - BA, Journalism Studies Concentration

University Studies - Journalism in the College of Liberal Arts represents an interdisciplinary approach to journalism education, with an emphasis on writing-intensive courses (four would be required as part of the concentration) and electives from other disciplines that complement and support the critical thinking skills required of journalists in the 21st century. In addition to the concentration in journalism through the University Studies degree, students in the program are required to have a minor within the College of Liberal Arts and another outside the college, substantially broadening the interdisciplinary aspects of journalism education.

Students with a degree in University Studies - Journalism would be prepared for a successful life and career in several ways. Their coursework would emphasize critical thinking skills—a necessary component in the changing world of journalism that relies on writing for different types of media with frequent updates and differing audiences. They would be exposed to experiential learning through classes that require students to report and write on deadline and by the requirement for an internship in the field. They would develop and enhance strong writing skills by taking up to four writing-intensive courses. The very nature of journalism—constantly reporting and evaluating new information while examining new topics—would prepare them to be thoughtful consumers of information and encourage them to engage in learning throughout their lifetimes.

A student enrolled in the University Studies concentration of Journalism may not pursue a double major or a double degree.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
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<tr>
<td>SOCI 205 to 499 (p. 960)</td>
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Program Requirements

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<tr>
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<td>Mass Media Information</td>
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<td>JOUR 203</td>
<td>Media Writing I</td>
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<td>JOUR 250/</td>
<td>New Media and the Independent</td>
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<td>Voice</td>
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<td>JOUR 484</td>
<td>Internship</td>
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<tr>
<td>JOUR 490</td>
<td>Journalism as a Profession</td>
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<tr>
<td>JOUR 303</td>
<td>Media Writing II</td>
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<td>JOUR 304</td>
<td>Editing for the Mass Media</td>
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<tr>
<td>JOUR 450</td>
<td>Political Reporting</td>
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<tr>
<td>JOUR 451</td>
<td>Arts &amp; Entertainment Journalism</td>
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<tr>
<td>JOUR 455</td>
<td>Literary Nonfiction</td>
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<td>JOUR 485</td>
<td>Directed Studies</td>
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<tr>
<td>JOUR 489</td>
<td>Special Topics in...</td>
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<tr>
<td>WGST 404</td>
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<td>JOUR 491</td>
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<tr>
<td>ECON 465</td>
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<td>ENGL 210</td>
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<td>HIST 343</td>
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<td>HIST 460</td>
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<td>HIST 470</td>
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College and University Requirements

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<tr>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>Communication (p. 22)</td>
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<td>3</td>
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<tr>
<td>Literature in English</td>
<td>6</td>
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<tr>
<td>Foreign language (p. 465)</td>
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<tr>
<td>Mathematics (p. 22)</td>
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<td>Life and physical sciences (p. 22)</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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<tr>
<td>Creative arts (p. 24)</td>
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<td></td>
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<tr>
<td>Language, philosophy and culture or creative arts (p. 23)</td>
<td>3</td>
<td></td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
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<tr>
<td>JOUR 102</td>
<td>American Mass Media</td>
<td>3</td>
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</table>
American history (p. 25) 3
POLS 206  American National Government 3
POLS 207  State and Local Government 3
International and cultural diversity (p. 40) 4

Minor 1 5 15-18
Minor 2 5 15-18
Free electives 0-6
Total Semester Credit Hours 120

1. Select from given list (p. 465) or courses for which one of the listed courses is a prerequisite.
2. A two-course sequence at the intermediate level (201 and 202).
3. One course may be in Texas history.
4. Course may be used to satisfy any other requirement.
5. One minor must be from outside the College of Liberal Arts.

Other courses may qualify. Consult the approved list of courses available from the undergraduate advisor in the Journalism Studies Program and from the Undergraduate Student Services Office in the College of Liberal Arts.

University Studies - BA, Race, Gender, Ethnicity Concentration

This area of concentration is purposefully designed to require that students complete coursework that educates them in interdisciplinary knowledge. Two inquiry-rich, research-based courses, one an introduction and one a capstone senior seminar, provide students with introductory and concluding courses in the methodologies appropriate to interdisciplinary studies in the Race, Gender, Ethnicity Concentration. Two minors are required for the degree; at least one minor must be from outside the College of Liberal Arts.

A student enrolled in the University Studies concentration of Race, Gender, Ethnicity may not pursue a double major or a double degree.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>AFST 201</td>
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<tr>
<td>AFST 302</td>
<td>Gateway Course</td>
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<tr>
<td>AFST 481</td>
<td>Seminar</td>
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</tr>
<tr>
<td>ANTH 205</td>
<td>Peoples and Cultures of the World</td>
<td></td>
</tr>
<tr>
<td>ANTH 301</td>
<td>Indians of North America</td>
<td></td>
</tr>
<tr>
<td>CLAS 330</td>
<td>Women in Ancient Greece and Rome</td>
<td></td>
</tr>
<tr>
<td>COMM 425</td>
<td>Rhetoric of the Civil Rights</td>
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<tr>
<td>COMM 425</td>
<td>Movement</td>
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<tr>
<td>COMM 431</td>
<td>Rhetoric of Social Movements</td>
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Social science elective

Select two of the following: 6

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<tr>
<th>Code</th>
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<tbody>
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<td>Women and Culture</td>
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<tr>
<td>WGST 404</td>
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</tr>
<tr>
<td>ANTH 427</td>
<td>Human Biological Variation</td>
</tr>
<tr>
<td>COMM 335</td>
<td>Intercultural Communication</td>
</tr>
<tr>
<td>COMM 407</td>
<td>Women, Minorities and the Mass</td>
</tr>
<tr>
<td>WGST 407</td>
<td>Media</td>
</tr>
<tr>
<td>COMM 420</td>
<td>Gender and Communication</td>
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<tr>
<td>WGST 420</td>
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<tr>
<td>POLS 304</td>
<td>Latino Politics in the United States</td>
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</table>
### University Studies - BA, Race, Gender, Ethnicity Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>POLS 317/ WGST 317</td>
<td>Women in Politics</td>
</tr>
<tr>
<td>POLS 320/ WGST 300</td>
<td>Race and Politics in the United States</td>
</tr>
<tr>
<td>POLS 462/ WGST 300</td>
<td>Women and the Law</td>
</tr>
<tr>
<td>PSYC 300/ WGST 300</td>
<td>Psychology of Women</td>
</tr>
<tr>
<td>SOCI 207/ WGST 207</td>
<td>Introduction to Gender and Society</td>
</tr>
<tr>
<td>SOCI 317/ AFST 317</td>
<td>Racial and Ethnic Relations</td>
</tr>
<tr>
<td>SOCI 323/ AFST 323</td>
<td>Sociology of African Americans</td>
</tr>
<tr>
<td>SOCI 403</td>
<td>Sociology of Latinos</td>
</tr>
<tr>
<td>SOCI 424/ WGST 424</td>
<td>Women and Work in Society</td>
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<tr>
<td>WGST 207/ SOCI 207</td>
<td>Introduction to Gender and Society</td>
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<td>WGST 404/ ANTH 404</td>
<td>Women and Culture</td>
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<td>WGST 407/ WGST 420</td>
<td>Women, Minorities and the Mass Media</td>
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<tr>
<td>WGST 420/ COMM 420</td>
<td>Gender and Communication</td>
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<td>WGST 424/ SOCI 424</td>
<td>Women and Work in Society</td>
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#### Humanities/Social sciences elective

Select two of the following: 6

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<tr>
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<td>Rhetoric of the Civil Rights Movement</td>
</tr>
<tr>
<td>COMM 431</td>
<td>Rhetoric of Social Movements</td>
</tr>
<tr>
<td>ENGL 204/ AFST 204</td>
<td>Introduction to African-American Literature</td>
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<tr>
<td>ENGL 329/ AFST 329</td>
<td>African-American Literature</td>
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<tr>
<td>ENGL 333/ WGST 333</td>
<td>Gay and Lesbian Literature</td>
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<tr>
<td>ENGL 338</td>
<td>American Ethnic Literature</td>
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<tr>
<td>ENGL 339/ AFST 339</td>
<td>African-American Literature Post-1930</td>
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<tr>
<td>ENGL 362/ HIS 362</td>
<td>Latino/a Literature</td>
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<tr>
<td>EURO 323</td>
<td>Immigration and Ethnicity in Contemporary France</td>
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<td>HIST 258</td>
<td>American Indian History</td>
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<tr>
<td>HIST 300/ AFST 300</td>
<td>Blacks in the United States, 1607-1877</td>
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<td>HIST 301/ AFST 301</td>
<td>Blacks in the United States Since 1877</td>
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<tr>
<td>HIST 304</td>
<td>Mexican-American Frontier to 1848</td>
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<td>HIST 305</td>
<td>Mexican-American History 1848-Present</td>
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<td>HIST 307</td>
<td>Latino Communities of the U.S.</td>
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<td>HIST 319</td>
<td>U.S. Immigration and Ethnicity</td>
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<td>HIST 330</td>
<td>Women in Ancient Greece and Rome</td>
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<td>HIST 345/ AFST 345</td>
<td>Modern Africa</td>
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<td>HIST 346/ AFST 346</td>
<td>History of South Africa</td>
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<td>HIST 401</td>
<td>Slavery in World History</td>
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<td>HIST 461/ WGST 461</td>
<td>History of American Women</td>
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<td>HIST 473/ WGST 473</td>
<td>History of Modern American Women</td>
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<td>HIST 476/ WGST 476</td>
<td>Sex and Sexuality in History</td>
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<td>HIST 477/ WGST 477</td>
<td>European History</td>
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<td>Dance and Identity in the United States</td>
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<td>SOCI 403</td>
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<td>SOCI 424/ WGST 424</td>
<td>Women and Work in Society</td>
</tr>
<tr>
<td>SPAN 412</td>
<td>U.S. Hispanic Writers</td>
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</table>
University Studies - BA, Religious Thought, Practices and Cultures Concentration

The concentration in Religious Thought, Practices and Cultures allows students to study religion through a variety of lenses: philosophical, historical, literary, artistic, and social. Students gain perspective on religion in the modern world and learn to analyze the impact of religious thought on human culture. Courses are taught by faculty from a range of disciplines and departments, so students can tailor the concentration their interests and goals.

No student enrolled in the University Studies concentration in Religious Thought, Practices and Cultures may pursue a double major or a double degree.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>RELS 480/</td>
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<td>ARCH 438</td>
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<td>PHIL 411</td>
<td>Medieval Philosophy</td>
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<tr>
<td>RELS 211/</td>
<td>Hebrew Scriptures</td>
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<tr>
<td>HUMA 211</td>
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<td>RELS 213/</td>
<td>New Testament</td>
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<td>HUMA 213</td>
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<td>RELS 220</td>
<td>History of Christianity: Origins to the Reformation</td>
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<tr>
<td>RELS 221/</td>
<td>History of Islam</td>
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<td>RELS 251/</td>
<td>Classical Mythology</td>
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<td>RELS 302</td>
<td>Women and Religion</td>
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<td>RELS 303/</td>
<td>Near Eastern Religions</td>
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<td>HUMA 303</td>
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<td>RELS 304/</td>
<td>Indian and Oriental Religions</td>
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<td>HUMA 304</td>
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<td>RELS 312</td>
<td>Contemplation in the Modern World</td>
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<td>RELS 317/</td>
<td>Introduction to Biblical Archaeology</td>
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<td>ANTH 317</td>
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<tr>
<td>RELS 321</td>
<td>Political Islam and Jihad</td>
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<td>RELS 326/</td>
<td>Sociology of Religion</td>
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<td>SOCI 326</td>
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<td>RELS 331/</td>
<td>Philosophy of Religion</td>
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<td>PHIL 331</td>
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<td>RELS 340/</td>
<td>Folklore and the Supernatural</td>
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<td>ANTH 340</td>
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<td>RELS 347/</td>
<td>Rise of Islam, 600-1258</td>
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<td>HIST 347</td>
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<td>RELS 360/</td>
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<td>History of Religion in America to 1860</td>
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<td>HIST 365</td>
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<td>ENGL 392</td>
<td>Culture</td>
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<td>Anthropology of Religion</td>
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<td>ANTH 403</td>
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</table>

1 Two American History courses or one American History course and one Texas History course will fulfill this requirement.

2 One course on federal government and one course on state/local government will fulfill this requirement. Completing four semesters of upper-level ROTC may be substituted for 3 semester hours of the six hours required.

3 100-499 courses not used elsewhere.
The requirements for this University Studies degree reflect the A.B.A.'s recommendation. Under the broad themes of Society, Ethics and Law, the degree requires classes that contribute to a broad understanding of philosophy, politics, economics and history. Specifically, S.E.A.L. requires that students complete 24 hours of major requirements, a minor in Philosophy, and a second minor outside of the Liberal Arts. In addition to obtaining a broad understanding of society, ethics and law, the degree requires that students pursue experiences and opportunities that typically cultivate the A.B.A.'s recommended skill set:

1. **Problem Solving** involves "courses and other experiences that will engage [students] in critical thinking about important issues, challenge...beliefs and improve...tolerance for uncertainty and criticism."[1]
2. **Critical Reading** involves "close reading and critical analysis of complex textual material."[1]
3. **Writing and Editing** involves "preparing original pieces of substantial length and revising written work in response to constructive criticism. [...] Language is the most important tool of a lawyer, and lawyers must learn how to express themselves clearly and concisely."[1]
4. **Oral Communication and Listening** involves "the ability to speak clearly and persuasively...and excellent listening skills."[1]
5. **Research** involves "undertaking a project that requires significant library research and the analysis of large amounts of information obtained from that research."[1]

The study of philosophy lends itself to the development of the five recommended skills. To this end, the required minor in Philosophy provides an opportunity to cultivate these skills.

Students are strongly advised to take philosophy courses over and above the minimum requirements for a minor, including independent studies and honors research courses.

The requirements for this University Studies degree reflect the A.B.A.'s recommendation. Under the broad themes of Society, Ethics and Law, the degree requires classes that contribute to a broad understanding of philosophy, politics, economics and history. Specifically, S.E.A.L. requires that students complete 24 hours of major requirements, a minor in Philosophy, and a second minor outside of the Liberal Arts. In addition to obtaining a broad understanding of society, ethics and law, the degree requires that students pursue experiences and opportunities that typically cultivate the A.B.A.'s recommended skill set:

1. **Problem Solving** involves "courses and other experiences that will engage [students] in critical thinking about important issues, challenge...beliefs and improve...tolerance for uncertainty and criticism."[1]
2. **Critical Reading** involves "close reading and critical analysis of complex textual material."[1]
3. **Writing and Editing** involves "preparing original pieces of substantial length and revising written work in response to constructive criticism. [...] Language is the most important tool of a lawyer, and lawyers must learn how to express themselves clearly and concisely."[1]
4. **Oral Communication and Listening** involves "the ability to speak clearly and persuasively...and excellent listening skills."[1]
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### University Studies - BS, Health Humanities Concentration

#### Overview
The College of Liberal Arts offers a degree in University Studies with a concentration in Health Humanities.

#### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHUM 107</td>
<td>Introduction to the Health Humanities</td>
<td>3</td>
</tr>
<tr>
<td>HHUM 482</td>
<td>Health Humanities Senior Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two from the following Humanities Courses: 6


Select two from the following Social Sciences Courses: 6


Students must take PHIL 484 and then choose the remainder of the required 6 hours from: COMM 203/COMM 240, COMM 243, COMM 301, COMM 324, COMM 325, COMM 327, COMM 420/WGST 420, ENGL 210, WGST 403, PHIL 300-499 and any course from the other focus areas listed.

Take 14 hours of the same language.

To be chosen from the college approved list (p. 465).

No more than one Texas History course can be used to satisfy this requirement.

This second minor must be chosen from outside of the College of Liberal Arts.

Any 100-499 courses not used elsewhere.
## UNIVERSITY STUDIES - BS, Liberal Arts Concentration

### Overview

The College of Liberal Arts offers a degree in University Studies with a concentration in Liberal Arts. The degree is intended to provide students the flexibility to create individualized degree plans in the college. The format also provides additional opportunities for study in the College of Liberal Arts when there is restricted admission to specific departments. The University Studies in Liberal Arts is a unique degree plan that consists of a foundational knowledge of Liberal Arts as a discipline, advanced work in social sciences and humanities, and two minors uniquely chosen by each student.

The 21-credit-hour concentration is uniquely administered by the college, rather than by a department, and includes coursework drawn from all 12 college departments and six interdisciplinary programs. The degree, although B.S., requires a year of college-level foreign language and an additional 12 hours of communication, literature, and social science.

A student enrolled in the University Studies concentration of Liberal Arts may not pursue a double major or a double degree.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBAR 203</td>
<td>Foundations of the Liberal Arts: Humanities</td>
<td>3</td>
</tr>
<tr>
<td>LBAR 204</td>
<td>Foundations of the Liberal Arts: Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td>LBAR 491</td>
<td>Research</td>
<td>3</td>
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<tr>
<td></td>
<td>Concentration electives in humanities</td>
<td>6</td>
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<tr>
<td></td>
<td>Concentration electives in social science</td>
<td>3</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>3</td>
</tr>
<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td>8</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
<td>9</td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
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<tr>
<td>Mathematics (p. 22)</td>
<td>3</td>
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<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
<td>3</td>
</tr>
<tr>
<td>Life and physical sciences (p. 22)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Foreign language (p. 465)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Creative arts and Language, Philosophy, and Culture (p. 24)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>American history (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Minor 2</td>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>Minor 2</td>
<td>15-18</td>
<td></td>
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<tr>
<td>General Electives 3</td>
<td>4-10</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

1. Writing Intensive Course
2. Two university approved minors are required for this degree program. One must be outside the College of Liberal Arts.
3. 100-499 courses not used elsewhere.

Students are required to complete six (6) semester credit hours that meet the International and Cultural Diversity (p. 40) requirements. Student are encourage to take courses that may also meet other requirements.

---

### Notes

- Students must be outside the College of Liberal Arts.
- One must be a minor in Social and behavioral sciences.
- Two minors are required for this degree program.
- University and College Requirements include:
  - Communication (p. 22)
  - Literature (p. 465)
  - Mathematics (p. 22)
  - Life and physical sciences (p. 22)
  - Language, philosophy and culture (p. 23)
  - Creative arts (p. 24)
  - Language, philosophy and creative arts (p. 23)

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### Additional Resources

- Course descriptions for specific courses are provided in the University Studies section of the catalog.
- Students are encouraged to consult with academic advisors to plan their course of study.

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### Final Remarks

- The degree is designed to provide a broad educational foundation and prepare students for graduate study or professional careers.
- Students are encouraged to explore interdisciplinary courses and experiences to enhance their learning.
- The University Studies concentration provides flexibility and opportunities for individualized study.

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### Conclusion

The University Studies - BS, Liberal Arts Concentration offers a unique degree plan that allows students to pursue a concentration in Liberal Arts while fulfilling requirements for a B.S. degree. The degree emphasizes foundational knowledge in Liberal Arts, advanced work in social sciences and humanities, and two minors chosen by the student. The program is designed to provide flexibility and opportunities for individualized study, preparing students for graduate study or professional careers.
GERM 101  Beginning German I  
&  GERM 102 and Beginning German II  
or  GERM 104  Intensive Beginning German  

CLAS 101  Beginning Classical Greek I  
&  CLAS 102 and Beginning Classical Greek II  

ITAL 101  Beginning Italian I  
&  ITAL 102  and Beginning Italian II  

JAPN 101  Beginning Japanese I  
&  JAPN 102 and Beginning Japanese II  

CLAS 121  Beginning Latin I  
&  CLAS 122 and Beginning Latin II  

RUSS 101  Beginning Russian I  
&  RUSS 102 and Beginning Russian II  

SPAN 101  Beginning Spanish I  
&  SPAN 102 and Beginning Spanish II  

Social and behavioral sciences (p. 25) 6  
American history (p. 25) 6  
Government/Political science 6  

POLS 206  American National Government  
POLS 207  State and Local Government  

Minor 1 6  
15-18  
Minor 2 6  
15-18  

Free electives 7  
1-7  

Total Semester Credit Hours 120  

1  Must be a Writing (W) course.  
2  Must make a grade of C or better.  
3  Select from 300- or 400-level courses with a prefix of AFST, ARAB, ASIA, CHIN, CLAS, ENGL, FILM, FREN, GERM, HISP, HIST, HUMA, INTS, ITAL, JAPN, JOUR, LBAR, LING, LMAS, MODL, MUSC, PERF, PHIL, RELS, RUSS, SPAN, THAR.  
4  Select from 300- or 400-level courses with prefix of ANTH, COMM, ECMT, ECON, POLS, PSYC, SOCI, WGST.  
5  Take six hours from college approved courses in literature.  
6  One minor must be chosen from outside the College of Liberal Arts.  
7  Any 100-499 courses not used elsewhere.  

University Studies - BS, Race, Gender, Ethnicity Concentration  

This area of concentration is purposefully designed to require that students complete coursework that educates them in interdisciplinary knowledge. Two inquiry-rich, research-based courses, one an introduction and one a capstone senior seminar, provide students with introductory and concluding courses in the methodologies appropriate to interdisciplinary studies in the Race, Gender, Ethnicity Concentration. Two minors are required; at least one must be outside the College of Liberal Arts.  

No student enrolled in the University Studies concentration of Race, Gender, Ethnicity may pursue a double major or a double degree.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 476/ WGST 476</td>
<td>Sex and Sexuality in History</td>
</tr>
<tr>
<td>HIST 477/ WGST 477</td>
<td>Women and Gender in Modern European History</td>
</tr>
<tr>
<td>PERF 326</td>
<td>Dance and Identity in the United States</td>
</tr>
<tr>
<td>SPAN 412</td>
<td>U.S. Hispanic Writers</td>
</tr>
<tr>
<td>WGST 330</td>
<td>Women in Ancient Greece and Rome</td>
</tr>
<tr>
<td>WGST 391</td>
<td>Studies in Gender and Diversity</td>
</tr>
</tbody>
</table>

**Social and behavioral sciences electives**

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<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>ANTH 404/ WGST 404</td>
<td>Women and Culture</td>
</tr>
<tr>
<td>ANTH 427</td>
<td>Human Biological Variation</td>
</tr>
<tr>
<td>COMM 335</td>
<td>Intercultural Communication</td>
</tr>
<tr>
<td>COMM 407/WGST 407</td>
<td>Women, Minorities and the Mass Media</td>
</tr>
<tr>
<td>COMM 420/WGST 420</td>
<td>Gender and Communication</td>
</tr>
<tr>
<td>COMPS 301</td>
<td>Latino Politics in the United States</td>
</tr>
<tr>
<td>COMPS 302</td>
<td>Women in Politics</td>
</tr>
<tr>
<td>COMPS 302</td>
<td>Race and Politics in the United States</td>
</tr>
<tr>
<td>COMPS 462/WGST 462</td>
<td>Women and the Law</td>
</tr>
<tr>
<td>PSYC 300/WGST 300</td>
<td>Psychology of Women</td>
</tr>
<tr>
<td>SOCI 207/WGST 207</td>
<td>Introduction to Gender and Society</td>
</tr>
<tr>
<td>SOCI 317/WGST 317</td>
<td>Racial and Ethnic Relations</td>
</tr>
<tr>
<td>AFST 317</td>
<td>Sociology of African Americans</td>
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<tr>
<td>AFST 323</td>
<td>Sociology of Latinos</td>
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<tr>
<td>SOCI 424/ WGST 424</td>
<td>Women and Work in Society</td>
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<tr>
<td>WGST 207/WGST 207</td>
<td>Introduction to Gender and Society</td>
</tr>
<tr>
<td>WGST 300/PSYC 300</td>
<td>Psychology of Women</td>
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<tr>
<td>WGST 317/WGST 317</td>
<td>Women in Politics</td>
</tr>
<tr>
<td>WGST 404/WGST 404</td>
<td>Women and Culture</td>
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<td>WGST 407/ WGST 407</td>
<td>Women, Minorities and the Mass Media</td>
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<td>COMM 407/WGST 407</td>
<td>Gender and Communication</td>
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<td>COMM 420/WGST 420</td>
<td>Gender and Communication</td>
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<tr>
<td>AFST 348</td>
<td>Gateway Course</td>
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<td>AFST 348</td>
<td>Seminar</td>
</tr>
<tr>
<td>ANTH 205</td>
<td>Peoples and Cultures of the World</td>
</tr>
<tr>
<td>ANTH 301</td>
<td>Indians of North America</td>
</tr>
<tr>
<td>ANTH 404/WGST 404</td>
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<td>COMM 420/Gender and Communication</td>
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<tr>
<td>COMM 425/Rhetoric of the Civil Rights</td>
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<tr>
<td>AFST 425</td>
<td>Movement</td>
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<tr>
<td>COMM 431</td>
<td>Rhetoric of Social Movements</td>
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<td>ENGL 204</td>
<td>Introduction to African-American Literature</td>
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<tr>
<td>AFST 204</td>
<td>Literature</td>
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<td>ENGL 329/African-American Literature</td>
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<tr>
<td>AFST 329</td>
<td>Pre-1930</td>
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<tr>
<td>ENGL 333/Gay and Lesbian Literature</td>
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<td>WGST 333</td>
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<td>ENGL 338</td>
<td>American Ethnic Literature</td>
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<tr>
<td>ENGL 339/African-American Literature</td>
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<tr>
<td>AFST 339</td>
<td>Post-1930</td>
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<tr>
<td>ENGL 362/Latino/a Literature</td>
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<td>HISP 362</td>
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<tr>
<td>EURO 323</td>
<td>Immigration and Ethnicity in Contemporary France</td>
</tr>
<tr>
<td>HIST 258</td>
<td>American Indian History</td>
</tr>
<tr>
<td>HIST 300/AFST 300</td>
<td>Blacks in the United States, 1607-1877</td>
</tr>
<tr>
<td>AFST 300</td>
<td>1607-1877</td>
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<tr>
<td>HIST 301/AFST 301</td>
<td>Blacks in the United States Since 1877</td>
</tr>
<tr>
<td>AFST 301</td>
<td>1877</td>
</tr>
<tr>
<td>HIST 304</td>
<td>Mexican-American Frontier to 1848</td>
</tr>
<tr>
<td>HIST 305</td>
<td>Mexican-American History 1848-Present</td>
</tr>
<tr>
<td>HIST 307</td>
<td>Latino Communities of the U.S.</td>
</tr>
<tr>
<td>HIST 319</td>
<td>U.S. Immigration and Ethnicity</td>
</tr>
<tr>
<td>HIST 330</td>
<td>Women in Ancient Greece and Rome</td>
</tr>
<tr>
<td>HIST 345/AFST 345</td>
<td>Modern Africa</td>
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<tr>
<td>HIST 346/AFST 346</td>
<td>History of South Africa</td>
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<td>HIST 401</td>
<td>Slavery in World History</td>
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<tr>
<td>HIST 461/WGST 461</td>
<td>History of American Women</td>
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<tr>
<td>HIST 473/WGST 473</td>
<td>History of Modern American Women</td>
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<td>WGST 473</td>
<td>Women</td>
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<tr>
<td>HIST 476/WGST 476</td>
<td>Sex and Sexuality in History</td>
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<td>WGST 476</td>
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<tr>
<td>HIST 477/WGST 477</td>
<td>Women and Gender in Modern European History</td>
</tr>
</tbody>
</table>

**Language, philosophy and culture or Social and behavioral science electives**

Select two of the following: **6**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>AFST 201</td>
<td>Introduction to Africana Studies</td>
</tr>
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<td>PERF 326</td>
<td>Dance and Identity in the United States</td>
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<td>Latino Politics in the United States</td>
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<td>Women in Politics</td>
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<td>SOCI 207</td>
<td>Introduction to Gender and Society</td>
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<td>SOCI 317</td>
<td>Racial and Ethnic Relations</td>
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<td>AFST 317</td>
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<td>SOCI 323</td>
<td>Sociology of African Americans</td>
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<tr>
<td>SOCI 403</td>
<td>Sociology of Latinos</td>
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<tr>
<td>SOCI 424</td>
<td>Women and Work in Society</td>
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<td>SPAN 412</td>
<td>U.S. Hispanic Writers</td>
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<td>WGST 207</td>
<td>Introduction to Gender and Society</td>
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<td>Women in Politics</td>
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<td>WGST 330</td>
<td>Women in Ancient Greece and Rome</td>
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<td>WGST 391</td>
<td>Studies in Gender and Diversity</td>
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<td>Women and Culture</td>
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<td>Women, Minorities and the Mass</td>
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<td>COMM 407</td>
<td>Media</td>
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<td>Gender and Communication</td>
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<td>Women and the Law</td>
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<td>POLS 462</td>
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<td>WGST 477</td>
<td>Women and Gender in Modern</td>
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<tr>
<td>HIST 477</td>
<td>European History</td>
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</tbody>
</table>

**University and College Requirements**

Select two from the following: 6

- Communication (p. 22)
- Mathematics (p. 22)
- Life and physical sciences (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- American history (p. 25)  
  3 semester hours
- Government/political science 3

1. Must be a capstone course meeting University Writing (W) Requirement.
2. Two American History courses or one American History course and one Texas History course will fulfill this requirement.
3. One course on federal government and one course on state/local government will fulfill this requirement. Completing four semesters of upper-level ROTC may be substituted for 3 semester hours of the six hours required.
4. 100-499 courses not used elsewhere.
COLLEGE OF NURSING

Administrative Officers
Dean · Sharon Wilkerson, Ph.D., R.N., C.N.E, A.N.E.F.
Associate Dean for Academic Affairs · Debra Matthews, Ph.D., R.N.
Associate Dean for Student Affairs · Kathryn McCallum, M.S.N., R.N.
Associate Dean for Finance and Administration · Shirley Davidson, M.B.A.
Assistant Dean for Undergraduate Studies – Brian Holland, Ph.D., R.N.
Interim Assistant Dean for Graduate Studies – Brian Holland, Ph.D., R.N.

General Statement
Registered nurses have been called the backbone of our health care system. Working on the front lines of health care, they treat patients, monitor and record their condition, help establish a plan of care, educate patients or the public about a health condition, and provide advice and emotional support to patients’ family members. Registered nurses are highly observant and detail-oriented and are often the first to catch important and changing signs and symptoms. They are increasingly being recognized as leaders in transforming the health care system to meet the burgeoning demand for prevention, wellness and primary care services with a focus on improving quality and managing costs. In addition to their clinical expertise, nurses are being sought out to serve in a variety of leadership posts on bodies developing policy recommendations related to a wide-range of health care policy issues.

Individuals who earn a nursing degree must first complete a national licensing examination in order to obtain a nursing license for practice. Further training or education can qualify nurses to work in specialty areas, such as emergency care, pediatrics, labor and delivery, psychiatry, oncology, surgery or public health. Graduate education can increase advancement opportunities for nurses including administrative positions, academic faculty positions, and as nurse practitioners.

The College of Nursing is committed to addressing the critical nursing shortage across Texas through exceptional educational programs in nursing. Our students are provided with cutting-edge classroom technologies and simulated experiences, which include standardized patients and virtual clinical learning activities. As leaders, our graduates are taught to question traditional methods and continually seek the best practices based on relevant clinical research. Through community service and leadership opportunities, the College of Nursing fosters a sense of social responsibility and global citizenship.

History
After receiving approval in 2008 from the Texas Board of Nursing, the College of Nursing located in Bryan-College Station, Texas, was created. Initially, 44 students were admitted expected to assist upon graduation with the severe nursing shortage across Texas. With a nursing workforce shortage and a large population that is aging and ready to retire, it is vital to the state of Texas to help increase the number of baccalaureate-prepared registered nurses. The college is committed to addressing this need. The faculty and staff believe that highly skilled nurses, working in collaboration with other health professionals, through research and service can enable individuals, families and groups to achieve a maximum state of well-being.

College of Nursing Programs
Program: Baccalaureate degree in nursing
Length: 12 to 22 months
General Admissions Requirements: Prerequisite coursework varies by program
Application Deadline: Varies depending on program of study
Start Term: Varies depending on program of study
Specialization, Program of Study: BSN Traditional Track, BSN Second Degree Track, RN to BSN Track
Degree: BSN.

Baccalaureate Degree in Nursing
The College of Nursing offers three tracks that lead to a Bachelor of Science in Nursing (BSN) degree. Upon obtaining the BSN degree, the prelicensure graduates will apply to take the registered nurse (RN) licensure examination.

Accreditation by the Commission on Collegiate Nursing Education (CCNE)
The Commission on Collegiate Nursing Education is an autonomous accrediting agency, contributing to the improvement of the public’s health. A specialized/professional accrediting agency, CCNE ensures the quality and integrity of baccalaureate and graduate nursing programs and of post-baccalaureate nurse residency programs. The Commission on Collegiate Nursing Education gave a full ten year accreditation to the College of Nursing in 2014 for the B.S.N. program. For more information on accreditation, go to www.aacn.nche.edu/ccne-accreditation (http://www.aacn.nche.edu/ccne-accreditation).

Good Academic Standing
Good academic standing is defined as having a minimum grade point average of a 2.0 (on a 4.0 scale), maintaining a minimum grade of C in all courses, and non-probationary status. Students must be in good academic standing in order to progress in the program. Grades of D, F, or U are not acceptable in nursing courses. Students who receive a grade of D, F or U in any course in any given semester will be automatically placed on probation and notified in writing of probation status. The student will remain on probation until the course is repeated with a C or better. The course can only be taken through the Texas A&M College of Nursing. Students who earn a grade of D or F upon repetition of a nursing course or have two nursing course failures are ineligible to continue enrollment in the College.

Students must complete the program to which they enrolled in three (3) consecutive years or six (6) long semesters. Exceptions for extenuating circumstances (i.e. serious illness, pregnancy, etc.) will be considered. In addition to obtaining grades of C or above in all nursing courses, students must demonstrate their ability to deliver safe care to patients at all times. Failure to provide safe patient care may result in immediate withdrawal from the course and, potentially, dismissal from the College of Nursing.

Academic Dismissal
Students will not be permitted to continue in the nursing program or apply for readmission if they:
1. receive a grade of D or F in more than one course,
2. receive any combination of grades of D or F on two attempts of the same course, or
3. receive notice of dismissal from the program by the Associate Dean for Academic Affairs or the Associate Dean for Student Affairs for failure to adhere to College of Nursing policy.

**Nursing Professional Code of Ethics**

Students in nursing and other health professions curricula are held to standards of conduct that both differ from and exceed those usually expected of university students. Each student enrolled in the College of Nursing is expected to uphold the professional code of ethics established for and by the nursing profession. The nurse recognizes that his/her first obligation is to the patient's welfare.

Any situation that threatens patient safety, exhibits a lack of moral character, demonstrates a lack of professionalism or good judgment, and/or proves harmful to the hospital or college environment is a violation of College/Hospital policy and may result in immediate termination from the program.

**Compliance Requirements for Clinical Courses**

Students must provide documentation confirming completion of compliance requirements prior to participating in clinical nursing courses. Information on requirements is provided upon admission and during New Student Orientation.

**Locations**

The College of Nursing educates students at two locations: Bryan/College Station and Round Rock, Texas. The Bryan/College Station campus opened in 2010 and serves as the headquarters of the Texas A&M Health Science Center College of Nursing. The 200-acre campus is located along State Highway 47 approximately three miles west of the main campus of Texas A&M University. In 2009, the College of Nursing opened a new facility in Round Rock providing a state-of-the-art 134,000-square-foot structure with classrooms, a simulation center, library, study lounge, student services and faculty offices. Additionally, the College of Nursing has two advising locations, Lufkin and McAllen, Texas.

Bryan/College Station Campus
8447 State Highway 47
Bryan, TX 77807-3260
(979) 436-0110
nursing.tamhsc.edu (http://nursing.tamhsc.edu)

Round Rock Campus
3950 North A. W. Grimes Blvd.
Round Rock, TX 78665
(512) 341-4200

McAllen Location
2101 South McColl Road
McAllen, TX 78503
(956) 668-6328

Lufkin Location
Angelina College, Health Careers Building
3500 South 1st Street, Room #H110
Lufkin, TX 75904
936-633-3293

**Faculty**

Ancheta, Angelita O, Clinical Assistant Professor
College Of Nursing
MSN, University of Phoenix, 2012

Authement, Renae S, Clinical Assistant Professor
College Of Nursing
DNP, Loyola University New Orleans, 2015

Bentley, Regina L, Clinical Associate Professor
College Of Nursing
EDD, Auburn University, 2004
MNU, Troy State University, 1989

Berger, Valerie L, Clinical Assistant Professor
College Of Nursing
MSN, Drexel University, 2008

Bonner, Rickie, Clinical Assistant Professor
College Of Nursing
DNP, Regis University, 2012

Bosenbark, Margaret J, Clinical Assistant Professor
College Of Nursing
MNU, Texas A&M University, 2016

Bruce, Richard C, Clinical Assistant Professor
College Of Nursing
MS, University of Phoenix, 2012

Burns, Rebecca J, Clinical Assistant Professor
College Of Nursing
DNP, Loyola University New Orleans, 2015

Charles, Laurie A, Clinical Assistant Professor
College Of Nursing
MS, Western Governor's University, 2015

Contreras, Nicola E, Clinical Assistant Professor
College Of Nursing
MS, Grand Canyon University, 2015

Cunningham, Sonia M, Clinical Assistant Professor
College Of Nursing
MS, Texas A&M University Corpus Christi, 1992

Decker, Willa A, Clinical Assistant Professor
College Of Nursing
MA, University of Houston at Clear Lake, 1989
MNU, Texas Women's University in Houston, 1979

Dormire, Sharon L, Professor
College Of Nursing
PHD, University of Florida, 1992

Downing, Nancy, Associate Professor
College Of Nursing
PHD, The University of Iowa, 2010

Ehlert, Patricia L, Clinical Assistant Professor
College Of Nursing
MS, University of Phoenix, 2004
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>College Of Nursing</th>
<th>Degree/Institution</th>
<th>Year</th>
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<tbody>
<tr>
<td>Gary, Jodie C</td>
<td>Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, The University of Texas at Tyler</td>
<td>2012</td>
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<tr>
<td>Gruben, Darla A</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, The University of Texas Health Science Center</td>
<td>1999</td>
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<tr>
<td>Hare, Martha L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, Texas Woman's University, DNP, Texas Tech University Health Science Center</td>
<td>2010</td>
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<tr>
<td>Hepfer, Katie L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>DNP, The University of Iowa</td>
<td>2016</td>
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<tr>
<td>Hoffman, Matt F</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>DNP, The University of Iowa</td>
<td>2016</td>
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<td>Holcomb, Jill L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, Texas A&amp;M University Corpus Christi, DNP</td>
<td>2010</td>
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<tr>
<td>Holland, Brian</td>
<td>Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, The University of Texas at Arlington, MSN, Lubbock Christian University</td>
<td>2014, 2008</td>
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<tr>
<td>Johnson, Carrie A</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>DNP, The University of Texas Health Science Center at Houston</td>
<td>2009</td>
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<tr>
<td>Jones-Schubart, Kara</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>DNP, The George Washington University</td>
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<tr>
<td>Kosarek, Jane G</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MBA, University of Dallas</td>
<td>1997</td>
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<tr>
<td>Landman, Whitney E</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, Western Governor's University, PHD</td>
<td>2016</td>
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<td>Landry, Karen</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
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<td>2008</td>
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<td>Livingston, Jerry L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, Capella University</td>
<td>2013</td>
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<td>Malecha, Ann T</td>
<td>Clinical Associate Professor</td>
<td>College Of Nursing</td>
<td>PHD, Texas Woman's University</td>
<td>1999</td>
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<td>Matthews, Debra</td>
<td>Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, Washington State University</td>
<td>2014</td>
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<td>Mitchell, Stacey A</td>
<td>Clinical Associate Professor</td>
<td>College Of Nursing</td>
<td>DNP, University of Tennessee Health Science Center, MNU, University of Virginia</td>
<td>2006, 1996</td>
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<tr>
<td>Moreland, Jack E</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, The University of Texas Health Science Center at Houston</td>
<td>2009</td>
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<tr>
<td>Mueller-Hinze, Maxine L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, The University of Texas at Austin</td>
<td>1988</td>
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<tr>
<td>Mulcahy, Angela M</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, University of North Dakota</td>
<td>2012</td>
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<tr>
<td>O'Briant, Deborah L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MSN, Texas Tech University Health Science Center</td>
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<tr>
<td>Parrott, Thena E</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, Texas A&amp;M University</td>
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<tr>
<td>Patel, Stephanie L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MS, Wright State University</td>
<td>2010</td>
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<td>Pickett, Laura A</td>
<td>Lecturer</td>
<td>College Of Nursing</td>
<td>MSN, Texas A&amp;M University Corpus Christi</td>
<td>2017</td>
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<tr>
<td>Pittman, Alison F</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>PHD, The University of Texas at Tyler</td>
<td>2017</td>
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<td>Pollard, Catherine P</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, The University of Texas at Austin</td>
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<td>Pullium, Cheryl L</td>
<td>Clinical Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, Texas Christian University</td>
<td>2006</td>
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<tr>
<td>Reynolds, Raquel Y</td>
<td>Assistant Professor</td>
<td>College Of Nursing</td>
<td>MNU, The University of Texas at Austin</td>
<td>2005</td>
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</table>
Roblyer, Kathleen A, Clinical Assistant Professor
College Of Nursing
DNP, The University of Alabama at Birmingham, 2015

Ruiz, Roberta Jeanne, Professor
College Of Nursing
PHD, The University of Texas Health Science Center, 1999

Scott, Lindsey L, Clinical Assistant Professor
College Of Nursing
MSN, Grand Canyon University, 2014

Seaback, Wanda F, Clinical Assistant Professor
College Of Nursing
MNU, Texas Woman's University, 2005

Sheridan, Daniel J, Professor
College Of Nursing
PHD, Oregon Health Sciences University, 1998

Simon, Ashley N, Clinical Assistant Professor
College Of Nursing
MNU, Texas A&M University, 2016

Turnbow, Sonia L, Clinical Assistant Professor
College Of Nursing
MNU, The University of Texas at El Paso, 1995

Utterback, Virginia Ann, Clinical Associate Professor
College Of Nursing
PHD, Texas Tech University, 2010

Van, Suzanne M, Clinical Assistant Professor
College Of Nursing
MNU, The University of Texas at El Paso, 2014

Wells-Beede, Elizabeth R, Clinical Assistant Professor
College Of Nursing
MS, University of Phoenix, 2010

Weston, Cynthia G, Assistant Professor
College Of Nursing
DNP, The University of Texas Health Science Center at San Antonio, 2014

White-Corey, Shelley J, Clinical Assistant Professor
College Of Nursing
MNU, The University of Texas Health Science Center at Houston, 2011

Wilkerson, Sharon A, Senior Professor
College Of Nursing
PHD, Wayne State University, 1982
MSN, University of Pennsylvania, 1976

Majors

College of Nursing
- Bachelor of Science in Nursing, RN to BSN Track (p. 573)
- Bachelor of Science in Nursing, Second Degree BSN Track (p. 574)
- Bachelor of Science in Nursing, Traditional BSN (p. 574)

Masters

College of Nursing
- Master of Science in Nursing in Family Nurse Practitioner (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/nursing/msn-family-practitioner)
- Master of Science in Nursing in Forensic Nursing (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/nursing/msn-forensic-nursing)
- Master of Science in Nursing in Nursing Education (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/nursing/msn)

Nursing - BSN, RN to BSN Track

The RN to BSN track is an opportunity for registered nurses who hold an associate’s degree in nursing from an accredited college or will have an A.D.N. degree conferred prior to the entry date. Applicants must hold a current, unencumbered license to practice in the State of Texas. Students may complete the 30 credit hour upper division course of study as either a full-time or a part-time student. The RN to BSN plan allows working nurses to balance career, education and other responsibilities. All applicants are required to complete prerequisite credit hours as noted above along with any outstanding core curriculum courses in order to receive the bachelor’s degree.

Entry to the RN to BSN (Bachelor of Science in Nursing) Program

Those who are already a registered nurse with an associate’s degree may apply for the RN to BSN program to obtain a bachelor’s degree. All applicants are expected to complete prerequisite coursework prior to the first class day. The course instruction is delivered online allowing students to balance career, family and other responsibilities along with advancing their education. Students may choose to complete the curriculum in 3 semesters (1-year option), in 4 semesters (1 1/2-year option) or in 5 semesters (2-year option). Applicants who completed their Associate Degree in Nursing through an LVN to RN or Paramedic to RN bridge program must have earned a minimum of 35 transferable credits in their program in order to apply.

Program Requirements

<table>
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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tr>
<td>NURS 460</td>
<td>Nursing Dimensions and Informatics for the RN</td>
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<tr>
<td>NURS 461</td>
<td>Application of Evidence Based Practice for the RN</td>
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<td>NURS 462</td>
<td>Pathophysiology and Pharmacology for the RN</td>
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<td>NURS 463</td>
<td>Health Assessment for the RN</td>
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<td>NURS 464</td>
<td>Health Promotion Across the Lifespan for the RN</td>
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<tr>
<td>NURS 465</td>
<td>Care of the Older Adult for the RN</td>
<td>2</td>
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<td>NURS 466</td>
<td>Community Health for the RN</td>
<td>5</td>
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<tr>
<td>NURS 467</td>
<td>Leadership and Management for the RN</td>
<td>5</td>
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</table>
Nursing - BSN, Second Degree BSN Track

The second degree (post baccalaureate) track is for students who already hold a bachelor’s degree in another field of study. Acceptance into this track requires successful completion of prerequisite coursework prior to beginning upper division courses. All students will be required to complete core curriculum requirements if these were not met in the previous degree program. Contact the Office of Student Affairs for more information.

Students with a previous bachelor’s degree may apply to the traditional BSN track and must follow the same requirements as noted above. If they met a core curriculum at another Texas institution in their previous degree program. Contact the Office of Student Affairs for more complete core curriculum requirements if these were not met in the previous degree program. Contact the Office of Student Affairs for more information.

1. the strength of the student’s academic background;
2. HESI A2 score;
3. the personal statement;
4. the student’s achievements and accomplishments, with emphasis on volunteer work and activities in health care; and
5. minimal academic history of repeats, withdraws or failures.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
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<td>NURS 468</td>
<td>Professional Practice Issues for the RN</td>
<td>2</td>
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<tr>
<td>Nutrition elective</td>
<td></td>
<td>3</td>
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<tr>
<td>NUTR 202</td>
<td>Fundamentals of Human Nutrition</td>
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<td>NUTR 203</td>
<td>Scientific Principles of Human Nutrition</td>
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<td>NUTR 222</td>
<td>Nutrition for Health and Health Care</td>
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<tr>
<td>Directed electives</td>
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College and University Requirements

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<thead>
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<th>Title</th>
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<tbody>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>American history (p. 25)</td>
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<td>6</td>
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<tr>
<td>Communication (p. 22)</td>
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<td>6</td>
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<td>Creative arts (p. 24)</td>
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<td>3</td>
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<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
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<td>Mathematics (p. 22)</td>
<td></td>
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<tr>
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</table>

1. See academic advisor for acceptable courses.

Nursing - BSN, Traditional BSN Track

The traditional track requires the successful completion of prerequisite coursework prior to beginning upper division courses. College counselors will be able to advise students regarding equivalencies to common course numbers. Information is also available regarding courses at www.tccns.org (http://www.tccns.org) and through the Texas A&M Transfer Course Equivalency (https://compass-ssb.tamu.edu/pls/PROD/bwxxkwtes.P_TransEquivMain) web page.

Upper Level Entry to the Traditional Bachelor of Science in Nursing

Admission decisions are based on:

1. the strength of the student’s academic background;
2. HESI A2 score;
3. the personal statement;
4. the student’s achievements and accomplishments, with emphasis on volunteer work and activities in health care; and
5. minimal academic history of repeats, withdraws or failures.

Program Requirements

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<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
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<td>Nursing Dimensions and Informatics</td>
<td>3</td>
</tr>
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<td>NURS 312</td>
<td>Introduction to Pathophysiology</td>
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</tr>
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<td>NURS 313</td>
<td>Nursing Fundamentals</td>
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<td>NURS 314</td>
<td>Health Assessment</td>
<td>3</td>
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<tr>
<td>NURS 315</td>
<td>Nursing and the Aged</td>
<td>3</td>
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<tr>
<td>NURS 316</td>
<td>Pharmacology Principles</td>
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<tr>
<td>NURS 320</td>
<td>Adult Nursing I</td>
<td>6</td>
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<tr>
<td>NURS 323</td>
<td>Nursing Care of Women, Families and Newborns</td>
<td>4</td>
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<tr>
<td>NURS 411</td>
<td>Evidence-Based Practice for Nurses</td>
<td>3</td>
</tr>
<tr>
<td>NURS 412</td>
<td>Care of Mental Health Clients</td>
<td>4</td>
</tr>
<tr>
<td>NURS 413</td>
<td>Nursing Care of Children and Families</td>
<td>4</td>
</tr>
<tr>
<td>NURS 420</td>
<td>Adult Nursing II</td>
<td>6</td>
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<td>NURS 421</td>
<td>Care of Community Health Clients</td>
<td>5</td>
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<tr>
<td>NURS 424</td>
<td>Professional Issues</td>
<td>2</td>
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<td>NURS 430</td>
<td>Transition to Professional Nursing Practice</td>
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<tr>
<td>NURS 431</td>
<td>Care of Vulnerable Populations or NURS 43</td>
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<tr>
<td>or NURS 43</td>
<td>Relations in Healthcare: Teamwork and Communication</td>
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<td>Special Topics In...</td>
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College and University Requirements

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<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
<td>American history (p. 25)</td>
<td></td>
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<td>Creative arts (p. 24)</td>
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<td>Language, philosophy and culture (p. 23)</td>
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<td>Life and physical sciences (p. 22)</td>
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<td>3</td>
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<tr>
<td>Total Semester Credit Hours</td>
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<td>120</td>
</tr>
</tbody>
</table>

1. See advisor for acceptable courses.
completing more than 50% of coursework in either Brazos, Williamson, Hidalgo and Angelina counties in the state of Texas. In addition, applicants are required to complete the HESI Admissions Assessment A2 exam within one year of the application deadline. Students may take the exam only one time per year. Admission requirements include the application, HESI score, personal statement, and transcript(s) from all colleges or universities attended. Admission decisions are based on:

1. the strength of the student’s academic background;
2. HESI A2 score;
3. the personal statement;
4. the student’s achievements and accomplishments, with emphasis on volunteer work and activities in health care; and
5. minimal academic history of repeats, withdraws or failures.

**Internal Transfer Applicants**

An Internal Transfer Applicant is a current Texas A&M University undergraduate in a non-nursing major who meets specific requirements to apply to the upper division sequence in Nursing. Meeting requirements does not guarantee admission, it only allows a student the opportunity to apply for a seat.

Students must submit the application no later than the published deadline in the term in which they are applying. Note: All academic information included on the application must be posted to and appear in a student’s official record at Texas A&M.

**External Transfer Applicants**

A limited number of External Transfer Applicants from colleges and universities outside of Texas A&M University will be admitted.

Students on the Blinn TEAM and those participating in the PSA program must follow the external transfer process found here (http://nursing.tamhsc.edu/traditional/external.html).

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>NURS 305</td>
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</tr>
<tr>
<td>NURS 430</td>
<td>Transition to Professional Nursing Practice</td>
<td>5</td>
</tr>
</tbody>
</table>

**College and University Requirements**

- **General electives**: 16

**Foreign Language**

Proficiency in a foreign language is required. Can be met by taking two years of the same language in high school or college credit.

**Prerequisite Courses**

Prerequisites may be planned or in progress during the application cycle, but must be completed with a grade of "C" or better before the program start date. The courses may be completed at any regionally accredited college or university.
Administrative Officers
Dean - Jay Maddock, Ph.D., FAAHB
Associate Dean for Academic Affairs - Amy L. Fairchild, Ph.D., M.P.H.
Associate Dean for Climate and Diversity - Lisako McKyer, Ph.D., M.P.H.
Associate Dean for Public Health Practice - Jennifer Griffith, Dr.P.H., M.P.H.
Associate Dean for Research - Marcia Ory, Ph.D., MPH
Assistant Dean for Academic Affairs - Thomas J. McDonald, Ph.D.
Assistant Dean for Finance and Administration - John O’Neil, M.B.A.
Director of Student Affairs - Erin Schneider, M.P.H.

General Statement
Founded in 1998 as the first public health school in the nation with a focus on rural and underserved communities, the School of Public Health developed into a nationally ranked, fully accredited public health research, service and training program. After only nine years, U.S. News & World Report ranked the school as a Top 25 Graduate School in Public Health.

Offering classes at the College Station campus as well as other Texas locations through distance education, the school provides public health bachelor’s, master’s and doctoral programs in several public health disciplines: epidemiology, biostatistics, environmental health, occupational health, occupational safety and health, health administration, policy and management, and health promotion and community health sciences. In addition to core public health curriculum, the school is home to several centers of research excellence.

Providing a forum for future public health leaders, the school builds an array of research strengths and practice skills for rural and urban settings.

History
The School of Public Health is the first of its kind in the nation. The Texas Legislature established the school in 1995 as part of a rural health initiative to better address rural health needs in the state. After receiving degree-granting authority for the Master of Public Health degree in April 1998 from the Texas Higher Education Coordinating Board, the School of Rural Public Health welcomed its inaugural class in September 1998.

In 2014, the School of Public Health welcomed its first students into the brand-new Bachelor of Science in Public Health program, the first program of its kind in the state affiliated with a fully accredited School of Public Health. With a mission to serve the public health needs of the entire state, the undergraduate program is based on a philosophy of health promotion and disease prevention to improve the quality of life of individuals, families, and communities in the State of Texas and beyond. Graduates of the BSPH program will be able to assess factors influencing health in populations as well as plan, design, implement and successfully manage effective healthcare programs and interventions as well as be well-positioned for careers in medicine, nursing and other allied health professions.

The school currently offers one bachelor’s degree program, three master’s degree programs, and two doctoral degree programs.

Location
The School of Public Health’s administration and faculty are located in a state-of-the-art, three-building complex in College Station, on the Texas A&M University west campus. The nearly 100,000-square-foot complex includes classrooms fully equipped with videoconferencing technology to support the school’s innovative distance education programs that reach across the breadth of the state. The laboratory building provides a venue for the school’s internationally regarded toxicology group to engage in exemplary public health work and provides a vehicle for training tomorrow’s researchers. The administration building houses the administration and faculty. In addition, the school operates on-going regional instructional and research programs at the McAllen campus.

School of Public Health - Undergraduate Office
121 SRPH Administration Building Adriance Road
College Station, TX 77843-1266
(979) 436-9463
BSPH@tamhsc.edu
http://sph.tamhsc.edu/phs/

Majors
Department of Public Health Studies
• Bachelor of Science of Public Health

Minors
Department of Public Health Studies
• Occupational Health and Safety Minor
• Public Health Minor

Masters
School of Public Health
• Master of Health Administration in Health Administration
• Master of Public Health in Occupational Safety and Health
• Master of Science in Public Health in Health Policy and Management

Department of Environmental and Occupational Health
• Master of Public Health in Environmental Health
Department of Epidemiology and Biostatistics

- Master of Public Health in Biostatistics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/epidemiology-biostatistics/biostatistics-mph)
- Master of Public Health in Epidemiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/epidemiology-biostatistics/epidemiology-mph)

Department of Health Policy and Management

- Master of Public Health in Health Policy and Management (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/health-policy-management/mph)

Department of Health Promotion and Community Health Sciences

- Master of Public Health in Health Promotion and Community Health Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/health-promotion-community-health-sciences/mph)

Doctoral

School of Public Health

- Doctor of Philosophy in Health Services Research (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/interdepartmental/health-services-research-phd)
- Doctor of Public Health in Epidemiology and Environmental Health (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/interdepartmental/epidemiology-environmental-health-drph)

Department of Health Promotion and Community Health Sciences

- Doctor of Public Health in Health Promotion and Community Health Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/public-health/health-promotion-community-health-sciences/drph)

Department of Public Health Studies

Our mission guides us toward improving population health throughout Texas and beyond by providing competency-based educational programs focused on the knowledge, skills, and abilities relevant to the practice of public health.

Our educational programs are strengthened by our commitment to regionally focused, practice-based scholarship and service.

Our vision is simple: Texas A&M Department of Public Health Studies graduates will be world renowned for their competency as public health practitioners and as the preferred “new hires” of health organizations!

We invite you to join our family of faculty, staff and students on our collective journey for improving population health.

Faculty

- Appiah, Bernard, Assistant Professor
  Public Health Studies
  DrPH, Texas A&M University, 2013
- Campos-Bowers, Monica H, Instructional Assistant Professor
  Public Health Studies
  DrPH, University of North Texas Health Science Center, 2008
- Carrino, Gerard E, Instructional Professor
  Public Health Studies
  PhD, Columbia University Mailman School of Public Health, 2005
- Clendenin, Angela G, Instructional Assistant Professor
  Public Health Studies
  MA, Seaton Hall University, South Orange, NJ, 2005
- Griffith, Jennifer M, Instructional Associate Professor
  Public Health Studies
  DrPH, University of North Carolina at Chapel Hill, 2004
  MPH, Texas A&M Health Science Center - School of Rural Public Health, 2000
- Hong, Yan, Associate Professor
  Public Health Studies
  PhD, Johns Hopkins University, Bloomberg School of Public Health, 2007
- Kodatt, Stephanie A, Assistant Professor
  Public Health Studies
  PhD, Our Lady of the Lake University, 2007
- Lin, Szu-Hsuan, Instructional Assistant Professor
  Public Health Studies
  PhD, Texas A&M University, 2015
- Mier, Nelda, Associate Professor
  Public Health Studies
  PhD, University of New Mexico, 2002
- Millard, Ann V, Associate Professor
  Public Health Studies
  PhD, The University of Texas at Austin, 1980
- Ramirez, Gilbert, Professor
  Public Health Studies
  DrPH, The University of Texas Health Science Center at Houston, 1986
- Ross, Jennifer A, Instructional Assistant Professor
  Public Health Studies
  DrPH, Texas A&M University, 2013

Majors

- Bachelor of Science in Public Health (p. 577)

Minors

- Occupational Health and Safety Minor (p. 580)
- Public Health Minor (p. 580)

Public Health - BS

Public Health professionals with a Bachelor of Science in Public Health (BSPH) are prepared to:
• assess factors influencing health in individuals, communities and populations
• plan effective programs and interventions
• design evaluations for those interventions
• successfully manage the implementation of those programs

The BSPH program is based on a philosophy of health promotion and disease prevention, to improve the quality of life of individuals, families and communities. The BSPH discipline focuses on four areas:

1. the multiple determinants of health, including biological, environmental, sociocultural, health service, and economic factors,
2. identification of scientific data, tools of informatics, and other information for identifying indicators of health status and health disparities and assessing the well-being of a community,
3. addressing major local, national, and global health challenges, and
4. designing public health approaches and interventions that improve health outcomes, population health and well-being.

The Bachelor of Science in Public Health degree program is more than a means to produce ready public health practitioners. It can complement or enrich a traditional biology-based pre-health degree plan for students intending professional education in medicine, nursing, allied health or other health professions. Notably the program establishes a specific entry-level baccalaureate degree in the Public Health academic pathway which, until recently, had started with a master’s degree.

## Program Requirements

### First Year

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<tr>
<th>Fall</th>
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<td>Introductory Biology I</td>
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<td>Communication (p. 22)</td>
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<tr>
<td>Mathematics (p. 22)</td>
<td>3</td>
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<td>Social and Behavioral Sciences (p. 25)</td>
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### Second Year

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<tr>
<td>POLS 206</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory</td>
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<td>American history (p. 25)</td>
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<td>Free Electives</td>
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<tbody>
<tr>
<td>POLS 207</td>
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<td>Language, philosophy and culture (p. 23)</td>
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<td>American history (p. 25)</td>
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### Third Year

<table>
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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>PHLT 302</td>
<td>Foundations of Public Health</td>
</tr>
<tr>
<td>PHLT 303</td>
<td>Social Context of Population Health</td>
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<tr>
<td>PHLT 304</td>
<td>Biological Basis of Public Health</td>
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<tr>
<td>PHLT 310</td>
<td>Public Health Writing</td>
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<tr>
<td>PHLT 313</td>
<td>Health Care and Public Health System</td>
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<td>Public Health Data Management and Assessment I</td>
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<tr>
<td>PHLT 410</td>
<td>Public Health Communication</td>
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<tr>
<td>PHLT 411</td>
<td>Project Management in Public Health</td>
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<td>PHLT 441</td>
<td>Strategies for Population Health Improvement</td>
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<td>BSPH Directed Electives</td>
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Select nine hours from the following:

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<th>Course</th>
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<tbody>
<tr>
<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
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<tr>
<td>BESC 401</td>
<td>Bioenvironmental Microbiology</td>
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<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
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<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
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<tr>
<td>BICH 412</td>
<td>Biochemistry Laboratory I</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>CHEM 238</td>
<td>Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>ENTO 210</td>
<td>Global Public Health Entomology</td>
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<tr>
<td>ENTO 423</td>
<td>Medical Entomology</td>
</tr>
<tr>
<td>ENTO 431/FIVS 431</td>
<td>The Science of Forensic Entomology</td>
</tr>
<tr>
<td>ENTO 432/FIVS 432</td>
<td>Applied Forensic Entomology</td>
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<td>GENE 301</td>
<td>Comprehensive Genetics</td>
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<td>GENE 312</td>
<td>Comprehensive Genetics Laboratory</td>
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<td>GENE 320/BIMS 320</td>
<td>Biomedical Genetics</td>
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<td>PHLT 306</td>
<td>Border Health</td>
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<tr>
<td>PHLT 308</td>
<td>Comparative Global Health Systems</td>
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<tr>
<td>PHLT 331</td>
<td>Occupational Safety and Health I</td>
</tr>
<tr>
<td>PHLT 332</td>
<td>Occupational Safety and Health II</td>
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<tr>
<td>Course</td>
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<tr>
<td>PHLT 333</td>
<td>Accident Investigation</td>
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<td>PHLT 334</td>
<td>Fire Safety and Workplace Hazards</td>
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<td>PHLT 335</td>
<td>Hazardous Materials</td>
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<td>PHLT 413</td>
<td>Public Health Informatics</td>
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<td>PHLT 414</td>
<td>Applications of Epidemiology in Public Health</td>
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<td>PHLT 416</td>
<td>Public Health Leadership and Ethics</td>
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<td>PHLT 417</td>
<td>Human Factors and Ergonomic Health and Safety</td>
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<td>PHLT 433</td>
<td>Industrial Inspections and Audit Techniques</td>
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<td>PHLT 434</td>
<td>Project Cost Benefit and Economics</td>
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<td>Public Health Studies Field Experience</td>
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<td>Environmental Health Planning and Policy</td>
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<td>VIBS 401</td>
<td>Developmental Neurotoxicology</td>
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<td>VIBS 407/</td>
<td>Core Ideas in Neuroscience</td>
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<td>NRSC 407</td>
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</tr>
<tr>
<td>VIBS 413</td>
<td>Introduction to Epidemiology</td>
</tr>
<tr>
<td>VIBS 420</td>
<td>Computer Applications in Public Health Research</td>
</tr>
<tr>
<td>VIBS 432</td>
<td>Public Health Practices</td>
</tr>
<tr>
<td>VTPB 408</td>
<td>Clinical Microbiology</td>
</tr>
<tr>
<td>VTPB 409</td>
<td>Introduction to Immunology</td>
</tr>
<tr>
<td>VTPB 438</td>
<td>Biomedical Virology</td>
</tr>
<tr>
<td>VTPB 487/</td>
<td>Biomedical Parasitology</td>
</tr>
<tr>
<td>BIOL 487</td>
<td></td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 18

### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHLT 307</td>
<td>Public Health in the Global Context</td>
</tr>
<tr>
<td>PHLT 415</td>
<td>Emergency Management in Public Health</td>
</tr>
<tr>
<td>PHLT 445</td>
<td>Applications of Public Health</td>
</tr>
<tr>
<td>BSPH Directed Electives</td>
<td>2 Courses, chosen in consultation with BSPH academic advisor.</td>
</tr>
</tbody>
</table>

Select six hours from the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESC 314</td>
<td>Pathogens, the Environment and Society</td>
</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
</tr>
<tr>
<td>BESC 401</td>
<td>Bioenvironmental Microbiology</td>
</tr>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
</tr>
<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
</tr>
<tr>
<td>BICH 412</td>
<td>Biochemistry Laboratory I</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>CHEM 238</td>
<td>Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>ENTO 210</td>
<td>Global Public Health Entomology</td>
</tr>
<tr>
<td>ENTO 423</td>
<td>Medical Entomology</td>
</tr>
<tr>
<td>ENTO 431/</td>
<td>The Science of Forensic Entomology</td>
</tr>
<tr>
<td>FIVS 431</td>
<td></td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 18

### Total Semester Credit Hours

120

1 Chosen in consultation with BSPH academic advisor.

2 BSPH Directed Electives: courses that constitute the major are those offered by the School of Public Health and those approved for public health studies electives. Additional courses may be available. Students must check with their academic advisor.

Approval of degree plan does not guarantee access to courses. Students must satisfy prerequisites, and some course (writing intensive classes...
included) are available to majors only. It is the responsibility of the student to ascertain whether there are any restrictions or prerequisites for courses in their degree plan.

**Occupational Health and Safety - Minor**

**Overview**

The Department of Public Health Studies offers a minor in Occupational Health and Safety.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHLT 331</td>
<td>Occupational Safety and Health I</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 333</td>
<td>Accident Investigation</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 432</td>
<td>Human Factors and Ergonomic Health and Safety</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 434</td>
<td>Project Cost Benefit and Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:  
- PHLT 305 Epidemiology in Public Health  
- PHLT 330 The Environment and Public Health

Total Semester Credit Hours  

Minimum 15 hours required.
Minimum of 6 hours at 300- to 400-level.
Minimum 2.0 TAMU GPA and a completed minor form filed in the Public Health Studies advising office.

**Public Health - Minor**

The Department of Public Health Studies offers a minor in Public Health.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHLT 302</td>
<td>Foundations of Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 303</td>
<td>Social Context of Population Health</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 305</td>
<td>Epidemiology in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHLT 330</td>
<td>The Environment and Public Health</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:  
- Any PHLT 3 credit course  
- Any relevant public health course  

Total Semester Credit Hours  

Minimum 15 hours required.
Minimum of 6 hours at 300- to 400-level.
Minimum 2.0 TAMU GPA and a completed minor form filed in the Public Health Studies advising office.

1 Must be approved by a Public Health Studies advisor.
COLLEGE OF SCIENCE

Administrative Officers
Dean - Meigan Aronson, Ph.D.
Associate Dean for Research - James Batteas, Ph.D.
Assistant Dean for Student Affairs - Yvette Hester, Ph.D.
Senior Advisor to the Dean - W. Michael Kemp, Ph.D.
Associate Dean for International Programs - Paulo Lima-Filho, Ph.D.
Associate Dean for Undergraduate Programs - Lucas Macri, Ph.D.
Associate Dean for External Relations - Marlan O. Scully, Ph.D.
Associate Dean for Strategic Planning - Sherry J. Yennello, Ph.D.
Associate Dean for Faculty Affairs and Graduate Studies - Mark J. Zoran, Ph.D.

General Statement
Nature, its origins and its evolution, its strengths and its frailties, its order and its perceived disarray, constitutes the realm of study classified as science. Scientists search for interconnecting relationships and traits of order to understand the nature of our universe. Each new discovery provides additional knowledge and frequently enables the solution of previously perplexing questions. Often technology is able to transform scientific discovery into applications which are beneficial to our everyday living. Technology would be impoverished were it not for the new knowledge continually being sought by scientists. At the same time, science could not progress without the advances in instrumentation and techniques generated by technology. Thus, a symbiotic relationship exists between science and technology, a relationship which permeates the courses and programs in the college.

The departments of the College of Science are organized to respond to the needs of students for both general and specialized education in science in offering the Bachelor of Science and the Bachelor of Arts degrees in Biology, Chemistry, Mathematics, Physics and University Studies. The former degree permits heavy emphasis in selected subject matter and closely allied fields, whereas the latter degree is designed for the student who desires a more broadly based education while still specializing in one of the sciences. Additionally, the college offers a Bachelor of Science degree in Applied Mathematical Science.

For this reason, many students select a degree program in science to complete their prerequisite courses for professional study programs. The early admissions option to professional schools of dentistry or medicine in the zoology degree program provides the opportunity for a student to receive a degree in zoology if they are successful in gaining admission to a professional study program in medicine or dentistry prior to completion of a regular four-year degree program. To receive the degree, they must complete all requirements under this program and successfully complete their first year of medical or dental school.

In addition to the Departments of Biology, Chemistry, Mathematics, Physics and Astronomy, and Statistics, the College of Science includes the Cyclotron Institute, a research institute that emphasizes fundamental studies of nuclear science in which both undergraduate and graduate students participate. The College of Science offers MS and PhD programs in various departments.

General Degree Requirements
Degree requirements for science majors are organized into:

1. general requirements, including University Core Curriculum requirements and College of Science requirements;
2. requirements of the major field of study;
3. requirements of the minor field of study for those students completing a BA degree; and
4. electives.

With the exception of physical activity and general elective requirements, courses taken to satisfy degree requirements must be taken for letter grades.

Students are responsible for selecting the courses in their degree plan and assuring they abide by Texas A&M University Student Rules in meeting all degree requirements. Each department has advisors who should be consulted in developing degree programs.

General Requirements
General requirements include those which are required in every degree program at the University. Please refer to these requirements defined in the University Core Curriculum and graduation requirements in foreign language sections of this catalog. Special guidelines should be noted in the following categories:

American History

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>history course ¹</td>
<td>3</td>
</tr>
<tr>
<td>U.S.</td>
<td>history course ¹</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>Semester Credit Hours</td>
<td>6</td>
</tr>
</tbody>
</table>

¹ Students seeking teacher certification must complete HIST 105 and HIST 106.

Three hours in history may be substituted by successfully completing the required four semesters of upper-level ROTC curriculum.

Government/Political Science

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>Semester Credit Hours</td>
<td>6</td>
</tr>
</tbody>
</table>

Three hours in political science may be substituted by successfully completing the required four semesters of upper-level ROTC curriculum.

International and Cultural Diversity Requirements
The international and Cultural Diversity portion of the Graduation requirements may be fulfilled by 6 hours from the approved list of courses (see the International and Cultural Diversity requirements (p. 40) page). These courses may be in addition to University Core Curriculum requirements, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements.
Major Field of Study
Each department sets its own requirements for the major. At least 12 semester hours in the major must be completed in advanced courses (300- or 400-level) in residence at Texas A&M.

Minor Field of Study
The BA degree requires a minor field of study or an area of emphasis for students pursuing teacher certification. A minor requires 15–18 semester hours in one discipline. Six of these hours must be advanced (300- or 400-level) courses. Students must contact the department offering the minor to determine course requirements. Students pursuing a BS degree may select an optional minor. Contact the department offering the minor to determine course requirements. Students must declare a minor no later than the date on which they apply for graduation.

Electives
Electives should be chosen to enhance the student’s degree program and/or complete professional school prerequisites if not contained in required courses in the degree plan. Elective courses must be above the minimum level required in other areas of the degree program. For example, MATH 102 is not acceptable because it is below the minimum requirement of calculus. Also, introductory courses to another field of study such as BIMS 101 and AGLS 101 will not count toward degree requirements. Lower-level ROTC courses are not acceptable as electives. Please consult an advisor when selecting electives.

Curricular Options
Honors Program
The College of Science participates in the University Honors Program designed to offer the superior student special opportunities for academic work of a range and depth appropriate to his or her capabilities and greater intellectual interests. For further information, refer to the section regarding the University Honors Program (p. 103).

Cooperative Education Program
Cooperative education enables students to gain practical work experience and a salary while completing academic requirements. During the four-year academic program, co-op students complete two to four periods of work away from campus, gaining experience through on-the-job training and thus improving their opportunities for future employment. The Cooperative Education Office provides additional information about this program.

Minor Field of Study
Each department in the College of Science offers a minor. Students interested in pursuing a minor in a field in the College should contact the department offering the minor.

Summer Internships
A number of programs are available throughout the country which offer summer employment to students interested in specific fields of study and training. Each departmental advisor has information pertaining to these programs.

Integrated Fast Track Bachelor’s and Master’s Degrees
The Department of Mathematics provides the opportunity for ambitious and talented students to earn a bachelor’s and a master’s degree within a five year period. Eligible students earn graduate credit during their undergraduate study which allows them to complete this option.

Interested students should contact the Mathematics Department if interested in this program.

Preparation for Professional Studies
Students interested in gaining admission to professional study programs in the health professions may do so through any course of study. Prerequisite course requirements may be completed as part of a regular degree program or through electives. Advising for students preparing for health profession careers is available, regardless of major, through the Office of Professional School Advising, 209 Koldus, (979) 847-8938.

Medicine and Dentistry
Curricula in biology, chemistry, mathematics and physics within the College of Science readily accommodate the required courses needed for admission to professional studies in medicine and dentistry. Admission to medical and dental schools require the following prerequisites:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Physical and Chemical Principles</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 114</td>
<td>Qualitative Analysis</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I &amp; CHEM 237</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II &amp; CHEM 238</td>
<td>4</td>
</tr>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 301</td>
<td>Introduction to Biometry</td>
<td>3</td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 303</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

English
English course (p. 792) 6

Early Admission Program
The College of Science offers two methods of awarding a baccalaureate degree to students who gain admission to professional school prior to completion of their degree. The Baccalaureate Degree Option for Students Granted Early Admission to Medical/Professional Programs is available to all students regardless of their major.
Most students complete a four-year program prior to acceptance to professional school and thus it is advised a degree program leading to a standard baccalaureate degree be selected.

**Veterinary Medicine**
Please refer to the Admission Requirements—Professional Curriculum listed in the College of Veterinary Medicine and Biomedical Sciences.

**Other Allied Health Programs**
There are many allied health fields students may prepare for through degree programs in the College of Science. Prerequisite requirements for admission should be completed as part of a degree granting program.

**Teacher Certification**
The Secondary Teaching Certificate may be obtained in conjunction with a major in the College of Science. Requirements for teacher certification may be found at the aggieTEACH (http://aggieteach.tamu.edu) website.

**Curricula in University Studies**
The College of Science has four different University Studies degree plans. A University Studies Degree generally consists of a concentration of 21-24 hours and two minors of 15-18 hours each. Some concentrations and minors contain required courses that have additional prerequisites. One of the two minors must be completed in a college outside of the College of Science. The student’s diploma will list Bachelor of Science in University Studies. The student’s area of concentrations and the two minors will be indicated on the student’s transcript.

Interested students must complete the online application and have necessary minor field approvals. The degree plans and applications may be found at www.science.tamu.edu/academics/degrees.php.

**Majors**

**College of Science**
- Bachelor of Science in University Studies, Mathematics for Business Concentration (p. 642)
- Bachelor of Science in University Studies, Mathematics for Teaching Concentration (p. 644)
- Bachelor of Science in University Studies, Mathematics for Pre-Professionals Concentration (p. 643)
- Bachelor of Science in University Studies, Science for Secondary Teaching Concentration (p. 643)

**Department of Biology**
- Bachelor of Arts in Biology (p. 590)
- Bachelor of Science in Biology (p. 591)
- Bachelor of Science in Microbiology (p. 592)
- Bachelor of Science in Molecular and Cell Biology (p. 593)
- Bachelor of Science in Zoology (p. 595)

**Department of Chemistry**
- Bachelor of Arts in Chemistry (p. 600)
- Bachelor of Arts in Chemistry, Biological Chemistry or Medical, Dental, Pharmacy School Track (p. 602)
- Bachelor of Arts in Chemistry, Chemical Education Track (p. 603)
- Bachelor of Arts in Chemistry, Environmental Chemistry Track (p. 605)
- Bachelor of Science in Chemistry (p. 607)
- Bachelor of Science in Chemistry, Biological Chemistry Track (p. 609)
- Bachelor of Science in Chemistry, Environmental Chemistry Track (p. 610)

**Department of Mathematics**
- Bachelor of Arts in Mathematics (p. 627)
- Bachelor of Arts in Mathematics and Master of Science in Mathematics, 5-Year Degree Program (p. 629)
- Bachelor of Science in Mathematics (p. 630)
- Bachelor of Science in Mathematics and Master of Science in Mathematics, 5-Year Degree Program (p. 632)
- Bachelor of Science in Applied Mathematical Sciences, Actuarial Emphasis (p. 617)
- Bachelor of Science in Applied Mathematical Sciences, Biological Science Emphasis (p. 618)
- Bachelor of Science in Applied Mathematical Sciences, Computational Emphasis (p. 619)
- Bachelor of Science in Applied Mathematical Sciences, Economics Emphasis (p. 621)
- Bachelor of Science in Applied Mathematical Sciences, Math Emphasis (p. 622)
- Bachelor of Science in Applied Mathematical Sciences, Statistics Emphasis (p. 624)
- Bachelor of Science in Applied Mathematical Sciences and Master of Science in Mathematics, 5-Year Degree Program (p. 625)

**Department of Physics and Astronomy**
- Bachelor of Arts in Physics (p. 637)
- Bachelor of Science in Physics (p. 638)

**Department of Statistics**
- Bachelor of Science in Statistics (p. 640)

**Minors**

**Department of Biology**
- Bioinformatics Minor (p. 596)
- Biology Minor (p. 597)

**Department of Chemistry**
- Chemistry Minor (p. 612)

**Department of Mathematics**
- Mathematics Minor (p. 634)

**Department of Physics**
- Astrophysics Minor (p. 639)
- Physics Minor (p. 639)

**Department of Statistics**
- Statistics Minor (p. 642)
Masters

Department of Biology
- Master of Science in Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/biology/ms)
- Master of Science in Microbiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/biology/microbiology-ms)

Department of Chemistry
- Master of Science in Chemistry (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/chemistry/ms)

Department of Mathematics
- Master of Science in Mathematics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/mathematics/ms)

Department of Physics and Astronomy
- Master of Science in Astronomy (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/physics-astronomy/astronomy-ms)
- Master of Science in Physics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/physics-astronomy/physics-ms)

Department of Statistics
- Master of Science in Analytics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/statistics/analytics-ms)
- Master of Science in Statistics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/statistics/ms)

Doctoral

Department of Biology
- Doctor of Philosophy in Biology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/biology/phd)
- Doctor of Philosophy in Microbiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/biology/microbiology-phd)

Department of Chemistry
- Doctor of Philosophy in Chemistry (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/chemistry/phd)

Department of Mathematics
- Doctor of Philosophy in Mathematics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/mathematics/phd)

Department of Physics and Astronomy
- Doctor of Philosophy in Applied Physics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/physics-astronomy/applied-physics-phd)
- Doctor of Philosophy in Astronomy (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/physics-astronomy/astronomy-phd)

Department of Statistics
- Doctor of Philosophy in Statistics (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/science/statistics/phd)

Department of Biology
No one really knows what the world will be like 50 years from now, but it is certain that biologists will be at the forefront of science attempting to find solutions to many of the world’s problems and to find answers to intriguing questions about animals, plants and microbes at the molecular, cellular, organismal and ecosystem levels. Biologists will be concerned with pollution of the environment, cause and cure of disease, population control, recurring food shortages, preservation of species and many other aspects resulting from the impact of technological changes on life forms. Those who are astounded by the array of living things on the earth and who seek challenging, creative work should consider a career in biology or in a biology-related field. The Department of Biology offers five distinct four-year curricula which lead to the baccalaureate degree. These are the Bachelor of Arts in Biology, Bachelor of Science in Biology, Bachelor of Science in Molecular and Cell Biology, Bachelor of Science in Microbiology and Bachelor of Science in Zoology. The curricula are designed to maximize postbaccalaureate opportunities in:

1. professional schools of medicine, veterinary medicine and dentistry;
2. allied health schools of physical and occupational therapy, physician assistant programs, optometry, pharmacy, and nursing;
3. graduate education leading to teaching and research careers in universities, in industry or in state or national agencies;
4. teaching at junior high or high school levels and
5. jobs in biotechnology, research laboratories, pharmaceutical companies and field biology.

The Department of Biology degree plans will enable students to complete all entrance requirements for graduate and professional schools as well as medical technology, pharmacy, optometry, nursing, physical therapy, and other paramedical and health support fields.

Advising
Because some careers in biology require advanced and/or specialized training, it is essential to take advantage of advising opportunities. In the Department of Biology, there are professional advisors in the Biology Undergraduate Programs Office. The advisor may be consulted prior to each registration period and as the student needs. Questions regarding registration, degree checks, transfer of courses, advanced placements and other academic matters are handled in the Office of Undergraduate Programs. Students with special interests in graduate study should consult the advisor. Information concerning entrance to professional schools of medicine, dentistry and other health related fields is available from the Office of Professional School Advising.

Requirements for all Baccalaureate Degrees in the Department of Biology
Each student seeking a baccalaureate degree in the Department of Biology is required to master a common body of knowledge in science. In addition, the student must take courses essential to a liberal education. Students will note that the first two years of all curricula
offered by the Department of Biology are similar. Electives must include the 6 hours of international and cultural diversity courses required for graduation. Students must also take at least two writing-intensive courses in biology. Other requirements for graduation are listed in the Texas A&M University Student Rules and this catalog.

Students in the Department of Biology must make a grade of C or better in BIOL 111 and BIOL 112. Additionally, students may have only one D in courses within the major used to satisfy required or directed electives for a given degree plan. It is required that the freshman and sophomore level biology, chemistry and math courses be completed before the start of the 5th full semester and before enrollment in any junior or senior level science.

Common Body of Knowledge

To assure that students have sufficient prerequisite training for advanced courses, Biology majors must complete a series of courses comprising a Common Body of Knowledge (CBK) prior to their junior year (5th full semester) and enrollment in upper level BIOL courses. A Biology student will be admitted into upper level Biology classes when he or she has met the following criteria:

Completion of a set of CBK courses (38 hours) before the student's 5th full semester to include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I ¹</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II ¹</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
<td></td>
</tr>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 237</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 238</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 8

- MATH 147 Calculus I for Biological Sciences & MATH 141 and Calculus II for Biological Sciences
- MATH 151 Engineering Mathematics I & MATH 152 and Engineering Mathematics II
- MATH 171 Analytic Geometry and Calculus & MATH 17: and Calculus

Total Semester Credit Hours 38

¹ A grade of C or better must be earned.

A student must be in good academic standing with an overall grade point average of a 2.0 or better overall and in the major.

Process

Students will be audited by the department to monitor progress of completion of the CBK. Students failing to complete the CBK within the first four full semesters at Texas A&M University may be blocked and forced to change majors or be required to meet with an academic advisor to see if they can be successful in the major. Students registering for upper-level Biology classes without completing the CBK, or without approval of the Undergraduate Advising Office, will be dropped from the roster.

Transfer Students

1. Transfer from within Texas A&M University: The Biology Department will accept changes of major from other departments at Texas A&M upon completion of AT LEAST one semester of an applicable BIOL course taken at Texas A&M and AT LEAST one semester of an applicable CHEM course taken at Texas A&M, with a minimum 2.5 grade point average overall for courses taken at Texas A&M, and a 2.5 grade point average in BIOL courses taken at Texas A&M, and a 2.5 or better grade point average in CHEM courses taken at Texas A&M. Students still must complete the CBK before being admitted to upper level BIOL courses.

2. Transfer students from other institutions to Biology must have completed the following:
   a. A minimum of 24 accredited college hours
   b. Sixteen hours of prescribed coursework:
      i. Eight hours of General Biology (TAMU BIOL 111 and BIOL 112 or Texas Common Course Numbers BIOL 1406 and 1407) with B's or better, and
      ii. Eight hours of General Chemistry (TAMU CHEM 101/CHM 111 and CHEM 102/CHM 112 or Texas Common Course Numbers CHEM 1411 and CHEM 1412) with B's or better, and
      iii. Eight hours of Calculus (TAMU MATH 147/MATH 148 or MATH 151/MATH 152 or MATH 171/MATH 172 or Texas Common Courses Numbers MATH 2413 and MATH 2414) with C's or better
   c. A minimum cumulative grade point average of a 3.0
   d. A minimum Biology and Chemistry grade point average of a 3.0

Biology Honors Program

The Biology Department Honors Program is open to highly talented and motivated students pursuing a major in any of our degree plans. Honors students will be part of a vibrant community within the department with enriched learning experiences in both the classroom and biology research laboratories.

Honors Requirements: Students wishing to graduate with honors distinctions in either Biology (BIOL), Microbiology (MICR), Zoology (ZOOL), or Molecular and Cellular Biology (BMCB) must earn 21 credits in Honors courses and meet the following minimum honors requirements in addition to those listed in the degree plan:

- 4 credits BIOL 111H or BIOL 112H*
- 3 credits BIOL 213H or BIOL 214H
- 3 credits at 300/400 BIOL honors or honors contract; any 600 BIOL; not to include BIOL 485H, BIOL 491H, or BIOL 495H
- 6 credits BIOL 491H
- 2 credits BIOL 495H
- 3 credits any honors course outside the College of Science
* This requirement may be waived with a score of 5 on the Biology AP exam, a score of 6 on the IB exam, or by taking an additional honors biology course at the 300 or 400 level.

Grade requirements at time of graduation:

- cumulative Texas A&M University GPR of 3.5 or higher
- cumulative honors GPR of 3.25 or higher
- no grade lower than a B in courses counting toward honors. If a student earns less than a B in an honors course, they will still receive University credit. However, they will need to take a different course to fulfill the honors requirement.
- no F*, given in cases of academic dishonesty, on the transcript

Honors recognition: All honors courses will be denoted as honors on students’ official transcripts. Furthermore, students completing the honors program will have the departmental honors distinction, as well as, any earned university or college distinction noted on the official transcript.

Admission to the Honors Program in Biology

Incoming Freshmen: Incoming freshmen should indicate their interest in the departmental honors program through the ApplyTexas site and choosing the “Apply to any Honors Program” after August 1. To be admitted, students should have a SAT score of 1250 or above (verbal +math and minimum of 600 on both sections) or a composite score of 28 or above on the ACT (minimum 27 on both verbal and math sections).

Students who have already completed their application and now wish to apply to the Biology Honors program can use the “Apply to any Honors Program” link at the Texas A&M Honors program site (http://honorsprograms.tamu.edu/Home).

Current or transfer students: Current or transfer students with a cumulative GPR of 3.5 or better can apply for admissions to the Biology Honors Program by writing a short (less than 300 word) memo requesting admittance to the departments honors director. When applying, students should keep in mind that they will need to fulfill all honors requirements. Please send memos to: biohonors@bio.tamu.edu.

Remaining in the program

In order to remain in the Biology Honors program, students must maintain a cumulative GPR at Texas A&M of 3.5 and honors GPR of 3.25. Students falling below these standards will be placed on probation for the next semester. Students unable to meet these standards for a second semester may be dismissed from the Biology Honors Program.

Contact us

Please direct any questions to biohonors@bio.tamu.edu or the biology advising office.

Human Biology Track

This unofficial track is for students interested in pursuing professional schools including medical, dental and allied health programs (e.g., nursing, occupational therapy, optometry, pharmacy, physical therapy and physician assistant). The focus of the science courses on human biology will better prepare these students for their chosen fields. Suggested courses include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social and Behavioral Science</td>
<td></td>
</tr>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology or SOCI 205</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Biology Electives</td>
<td></td>
</tr>
<tr>
<td>BIOL 318</td>
<td>Chordate Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 344</td>
<td>Embryology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 388</td>
<td>Principles of Animal Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Molecular and Human Medical Mycology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 454</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 456</td>
<td>Medical Microbiology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Free Electives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HLTH 335</td>
<td>Human Diseases</td>
</tr>
<tr>
<td></td>
<td>HLTH 354</td>
<td>Medical Terminology for the Health Professions</td>
</tr>
<tr>
<td></td>
<td>URPN 370</td>
<td>Health Systems Planning</td>
</tr>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology or SOCI 205</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Biology Electives</td>
<td></td>
</tr>
<tr>
<td>BIOL 318</td>
<td>Chordate Anatomy</td>
<td>4</td>
</tr>
<tr>
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<td>Embryology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 388</td>
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<td>4</td>
</tr>
<tr>
<td>BIOL 437</td>
<td>Molecular and Human Medical Mycology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 454</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 456</td>
<td>Medical Microbiology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International and Cultural Diversity</td>
<td></td>
</tr>
<tr>
<td>HLTH 236</td>
<td>Race, Ethnicity and Health</td>
<td>3</td>
</tr>
<tr>
<td>HLTH 334/</td>
<td>Women's Health</td>
<td>3</td>
</tr>
<tr>
<td>WGST 334</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours 64

Students should consult their academic advisor about the courses that best fit their career interests.

Education Track

This unofficial track is for students wishing to acquire state certification to teach at the secondary level upon graduation. Students should seek advice from the advisors within their department and from the College of Education and Human Development, as well as from the advisor in charge of their teaching option. The intention is to make the best possible use of social science, humanity, free and directed electives in the Bachelor of Arts in Biology, thereby condensing as many of the certification requirements as possible into the degree plan. Courses should include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social and Behavioral Science</td>
<td></td>
</tr>
<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>INST 222</td>
<td>Foundations of Education in a Multicultural Society</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Biology Electives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upper-level BIOL courses, including two writing intensive courses (p. 741)</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Free Electives</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social and Behavioral Science</td>
<td></td>
</tr>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology or SOCI 205</td>
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</tr>
<tr>
<td></td>
<td>Biology Electives</td>
<td></td>
</tr>
<tr>
<td>BIOL 318</td>
<td>Chordate Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 344</td>
<td>Embryology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 388</td>
<td>Principles of Animal Physiology</td>
<td>4</td>
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<tr>
<td>BIOL 437</td>
<td>Molecular and Human Medical Mycology</td>
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<tr>
<td>BIOL 456</td>
<td>Medical Microbiology</td>
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</tr>
<tr>
<td></td>
<td>Free Electives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HLTH 335</td>
<td>Human Diseases</td>
</tr>
<tr>
<td></td>
<td>HLTH 354</td>
<td>Medical Terminology for the Health Professions</td>
</tr>
<tr>
<td></td>
<td>URPN 370</td>
<td>Health Systems Planning</td>
</tr>
<tr>
<td>PSYC 107</td>
<td>Introduction to Psychology or SOCI 205</td>
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</tr>
<tr>
<td></td>
<td>Biology Electives</td>
<td></td>
</tr>
<tr>
<td>BIOL 318</td>
<td>Chordate Anatomy</td>
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<tr>
<td>BIOL 344</td>
<td>Embryology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 388</td>
<td>Principles of Animal Physiology</td>
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<tr>
<td>BIOL 437</td>
<td>Molecular and Human Medical Mycology</td>
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<tr>
<td>BIOL 454</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 456</td>
<td>Medical Microbiology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International and Cultural Diversity</td>
<td></td>
</tr>
<tr>
<td>HLTH 236</td>
<td>Race, Ethnicity and Health</td>
<td>3</td>
</tr>
<tr>
<td>HLTH 334/</td>
<td>Women's Health</td>
<td>3</td>
</tr>
<tr>
<td>WGST 334</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 64

Students should consult their academic advisor about the courses that best fit their career interests.
RDNG 372  Reading and Writing across the Middle Grades Curriculum 3
or RDNG 465  or Reading in the Middle and Secondary Grades

TEFB 322  Teaching and Schooling in Modern Society 3

TEFB 324  Teaching Skills II 3

TEFB 406  Science in the Middle and Secondary School 3

Student teaching

Total Semester Credit Hours 32

**Marine Biology Track**

This unofficial track is for students requiring a more rigorous and in-depth foundation in biological courses that apply to marine environments and ecosystems. This suggested degree plan is ideal for students who intend to pursue graduate studies in marine biology or serve as field biologists at national seashores or sanctuaries. A minimum of 20 hours is required to fulfill this requirement, to be chosen from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 335</td>
<td>Invertebrate Zoology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 440</td>
<td>Marine Biology</td>
<td>4</td>
</tr>
<tr>
<td>Related ZOOL research or field experience</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>p. (994)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Free Electives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCNG 251</td>
<td>Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>or OCNG 40</td>
<td>or Interdisciplinary Oceanography</td>
<td></td>
</tr>
<tr>
<td>or OCNG 42</td>
<td>or Biological Oceanography</td>
<td></td>
</tr>
<tr>
<td>WFSC 311</td>
<td>Ichthyology</td>
<td>3</td>
</tr>
<tr>
<td>WFSC 425</td>
<td>Marine Fisheries</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Students should consult their academic advisor about the courses that best fit their career interests.

**Ecology/Environmental Track**

This unofficial track is particularly designed for students interested in environmental consulting, environmental protection and ecosystem evaluation. This suggested degree plan can be adapted to focus on particular areas or populations within an ecosystem. A minimum of 18 hours is required to fulfill this requirement, to be chosen from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<tr>
<td><strong>Biological Electives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 335</td>
<td>Invertebrate Zoology</td>
<td>3-4</td>
</tr>
<tr>
<td>BIOL 357</td>
<td>Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 358</td>
<td>Ecology Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 400</td>
<td>Tropical Ecology Costa Rica</td>
<td></td>
</tr>
<tr>
<td>BIOL 440</td>
<td>Marine Biology</td>
<td></td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>12-15</td>
<td></td>
</tr>
</tbody>
</table>

Students should consult their academic advisor about the courses that best fit their career interests.

**Quantitative Biology Track**

This unofficial track is for students interested in applying quantitative approaches, including mathematical, statistical, and computational techniques, to fundamental problems in biology. Because courses for this track are still being developed in conjunction with the Departments of Mathematics and Statistics, students should check with their advisor for new quantitative biology courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
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<tr>
<td>MATH 172</td>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 289</td>
<td>Special Topics in...</td>
<td>1-4</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>12-15</td>
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</tbody>
</table>

**Liberal Education Requirements of the University, College or State**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>American history elective (p. 25)</td>
<td>6</td>
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</tr>
<tr>
<td>Communication elective (p. 22)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Government/Political science elective (p. 25)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences elective (p. 25)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Creative arts elective (p. 24)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>International and cultural diversity elective (p. 40)</td>
<td>0-6</td>
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</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td>27-33</td>
<td></td>
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</tbody>
</table>
Faculty

Alexander, Michael B, Lab Instructor
Biology
PHD, Texas A&M University, 2014

Aramayo, Rodolfo A, Associate Professor
Biology
PHD, University of Georgia, 1992

Armstrong, Beth E, Lab Instructor
Biology
MS, Texas A&M University, 2006

Aufderheide, Karl J, Associate Professor
Biology
PHD, University of Minnesota, Twin Cities, 1974

Bell-Pedersen, Deborah, Professor
Biology
PHD, State University of New York at Albany, 1991

Benedik, Michael J, Professor
Biology
PHD, Stanford University, 1982

Beremand, Phillip D, Lab Instructor
Biology
PHD, Indiana University, 1979

Bernardo, Joseph, Research Associate Professor
Biology
PHD, Duke University, 1991

Carney, Ginger E, Professor
Biology
PHD, University of Georgia, 1998

Cohn, William B, Senior Lecturer
Biology
PHD, Texas A&M University, 2000

Criscione, Charles D, Associate Professor
Biology
PHD, Oregon State University, 2005

Epps, Sharon V, Lab Instructor
Biology
MS, Texas A&M University, 2013

Erickson, James W, Associate Professor
Biology
PHD, University of Wisconsin - Madison, 1989

Garcia, Luis R, Professor
Biology
PHD, The University of Texas at Austin, 1996

Gomer, Richard H, Professor
Biology
PHD, California Institute of Technology, 1983

Greenbaum, Ira F, Professor
Biology
PHD, Texas Tech University, 1978

Griffing, Lawrence R, Associate Professor
Biology
PHD, Stanford University, 1981

Hardin, Paul E, Distinguished Professor
Biology
PHD, Indiana University, 1987

Harlow, Mark L, Assistant Professor
Biology
PHD, Stanford University, 2001

Jones, Adam G, Professor
Biology
PHD, University of Georgia, 1998

Jung, Jae Hoon, Research Assistant Professor
Biology
PHD, Stanford University, 2009

Kemp, Walter M, Professor
Biology
PHD, The Tulane University of Louisiana, 1969

Lee, Christopher P, Lecturer
Biology
PHD, Texas A&M University, 2014

Lekven, Arne C, Professor
Biology
MS, University of California, Los Angeles, 1996

Lin, Xiaorong, Professor
Biology
PHD, University of Georgia, 2003

Lockless, Steve W, Associate Professor
Biology
PHD, The University of Texas at Dallas, 2002

Lyons, Jacob I, Lab Instructor
Biology
MS, Texas State University, 2010

Mackenzie, Duncan S, Associate Professor
Biology
PHD, University of California, Berkeley, 1980

Manson, Michael D, Professor
Biology
PHD, Stanford University, 1976

McKnight, Thomas D, Professor
Biology
PHD, University of Georgia, 1983

McMahan, Uel J, Professor
Biology
PHD, University of Tennessee Medical Units, 1964

Menet, Jerome, Assistant Professor
Biology
PHD, Louis Pasteur University, 2003
Merlin, Christine, Assistant Professor
Biology
PHD, University Pierre and Marie Curie, 2006

Moyes, Rita J, Instructional Associate Professor
Biology
PHD, Texas A&M University, 1992

Nan, Beiyian, Assistant Professor
Biology
PHD, Peking University, China, 2007

Norton, Jerry D, Lab Instructor
Biology
PHD, The University of Texas at Austin, 1994

Pepper, Alan E, Associate Professor
Biology
PHD, University of California, Davis, 1990

Pilling, Darrell, Research Assistant Professor
Biology
PHD, University of Birmingham, 1995

Qin, Hongmin, Associate Professor
Biology
PHD, Institute of Microbiology, Chinese Academy of Sciences, 1999

Rao, Asha, Senior Lecturer
Biology
PHD, Texas A&M University, 2002

Riley, Bruce B, Professor
Biology
PHD, University of Wisconsin - Madison, 1990

Rosenthal, Gil G, Professor
Biology
PHD, The University of Texas at Austin, 2000

Ryan, Kathryn J, Instructional Assistant Professor
Biology
PHD, Baylor College of Medicine, 1998

Sachs, Matthew S, Professor
Biology
PHD, Massachusetts Institute of Technology, 1986

Schartl, Manfred, Visiting Professor
Biology
PHD, University of Gießen, 1978

Scott, Timothy P, Professor
Biology
PHD, Texas A&M University, 1996

Siegele, Deborah A, Associate Professor
Biology
PHD, University of Wisconsin - Madison, 1989

Smith, James L, Associate Professor
Biology
PHD, University of Florida, 2002

Smotherman, Michael S, Associate Professor
Biology
PHD, University of California, Los Angeles, 1998

Sorg, Joseph A, Associate Professor
Biology
PHD, University of Chicago, 2006

Szule, Joseph A, Research Assistant Professor
Biology
PHD, University of Calgary, 2005

Tag, Andrew G, Senior Lecturer
Biology
PHD, Texas A&M University, 2003

Taylor, Lathrop, Senior Lecturer
Biology
PHD, Texas A&M University, 1985

Thomas, Terry L, Professor
Biology
PHD, The University of Georgia, 1975

Thompson, Wesley J, Professor
Biology
PHD, University of California, Berkeley, 1975

Versaw, Wayne K, Associate Professor
Biology
PHD, University of Wisconsin - Madison, 1995

Wan, Wei, Senior Lecturer
Biology
PHD, University of California, Davis, 2005

Whitaker, Gregory H, Lab Instructor
Biology
PHD, Texas A&M University, 2015

Wicksten, Mary K, Professor
Biology
PHD, University of Southern California, 1977

Winemiller, Leslie K, Senior Lecturer
Biology
PHD, The University of Texas at Austin, 1989

Wright, Rachel N, Lab Instructor
Biology
PHD, Texas A&M University, 2011

Zoran, Mark J, Professor
Biology
PHD, Iowa State University, 1987

Majors

- Bachelor of Arts in Biology (p. 590)
- Bachelor of Science in Biology (p. 591)
- Bachelor of Science in Microbiology (p. 592)
- Bachelor of Science in Molecular and Cell Biology (p. 593)
- Bachelor of Science in Zoology (p. 595)
## Minors
- Bioinformatics Minor (p. 596)
- Biology Minor (p. 597)

## Biology - BA

The BA degree in Biology, through the availability of a large number of electives, gives students maximum flexibility in earning a biology degree. The 15-18 hour minor requirement, including 6 hours of advanced courses in a discipline other than biology, provides students with the opportunity to include significant coursework in areas such as foreign language, business, education, or social sciences. The BA program is recommended for students with broad educational objectives or who intend to pursue further education in areas such as allied health professions, professional schools, or teaching certification.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Communication elective (p. 22)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
<td></td>
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<td>MATH 148</td>
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#### Second Year

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<td></td>
<td>OCN 420</td>
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<td></td>
<td>VIBS 343</td>
<td>Histology</td>
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<td></td>
<td>VIBS 443</td>
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#### Fourth Year

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<td></td>
<td>OCN 420</td>
<td>Biological Oceanography</td>
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<td>VIBS 343</td>
<td>Histology</td>
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<td>VIBS 443</td>
<td>Biology of Mammalian Cells and Tissues</td>
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<td>Principles of Genetics and Comprehensive Genetics Laboratory</td>
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<td>OCN 420</td>
<td>Biological Oceanography</td>
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<td></td>
<td>VIBS 343</td>
<td>Histology</td>
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<td></td>
<td>VIBS 443</td>
<td>Biology of Mammalian Cells and Tissues</td>
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</table>
Creative arts elective (p. 24)  3
Language, philosophy and culture elective (p. 23)  3
Electives  4  7

Semester Credit Hours  17
Total Semester Credit Hours  62

3 Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

4 Select from any 100-499 course not used elsewhere. (Except AGLS 101; BIMS 101; BIOL 101, BIOL 107, BIOL 113, BIOL 206; BUSN 100; CAEN 100-499 (p. 751); CHEM 106, CHEM 116; HORT 101; MATH 102; STLC 100-499 (p. 972); WFSC 101.) Only one KINE 199 may be used as a general elective.

5 Two courses in the major must be designated as writing intensive.

**Total Program Hours 120**

**Biology - BS**

The BS degree in Biology is designed for students to obtain a comprehensive, solid foundation in the major branches of Biology. The degree provides the opportunity for extensive study across the breadth of biological disciplines, ranging from molecular and cellular biology to ecology and evolution. This degree plan is recommended for students preparing for graduate programs in biological sciences or any professional programs in health and medical sciences such as medical, dental or veterinary schools.

**Program Requirements**

### First Year

#### Fall

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>CHEM 101</td>
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<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
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Semester Credit Hours  15

### Spring

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<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<td>MATH 148</td>
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<td>Communication elective (p. 22)</td>
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Semester Credit Hours  15

### Second Year

#### Fall

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<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<td>&amp; CHEM 237</td>
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<td>PHYS 201</td>
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Semester Credit Hours  15

### Third Year

#### Fall

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<td>and Biochemistry Laboratory I</td>
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<td>GENE 302</td>
<td>Principles of Genetics</td>
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<td>&amp; GENE 312</td>
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<td>STAT 302</td>
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Semester Credit Hours  15

### Spring

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<tr>
<td>BICH 464</td>
<td>Bacteriophage Genomics</td>
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<tr>
<td>400 level GENE course (p. 821)</td>
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<td>OCNG 420</td>
<td>Biological Oceanography</td>
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<td>VIBS 343</td>
<td>Histology or Biology of Mammalian Cells and Tissues</td>
<td>4</td>
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<tr>
<td>or VIBS 443</td>
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Semester Credit Hours  14

### Fourth Year

#### Fall

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<td>BICH 464</td>
<td>Bacteriophage Genomics</td>
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Semester Credit Hours  15

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1 Students seeking teacher certification must take HIST 105 and HIST 106. Other students may choose HIST 105 and HIST 106 or any 6 hours of American history courses (3 hours may be in Texas history).

2 Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

The following are CBK courses and must be completed prior to the start of 5th full semester: BIOL 111, BIOL 112, BIOL 213, BIOL 214, CHEM 101 & CHEM 111, CHEM 102 & CHEM 112, CHEM 227 & CHEM 237, CHEM 228 & CHEM 238, MATH 147, MATH 148.
Program Requirements

**Microbiology - BS**

The degree program in Microbiology is designed to provide a comprehensive education in the biology of microorganisms. A graduate of this program will have a thorough grounding in the classical areas of microbial physiology and biochemistry, microbial genetics, and developing areas like the molecular biology of microorganisms. The curriculum provides excellent training toward a career in any one of many areas of industrial microbiology and public health services. It is also an ideal preparation for advanced study or professional school in medicine, dentistry and other related fields, especially medical technology and biotechnology.

### Program Requirements

#### First Year

**Fall**

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<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
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**Spring**

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<td>and Fundamentals of Chemistry Laboratory II</td>
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<td>MATH 148</td>
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#### Second Year

**Fall**

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<td>CHEM 227 &amp; CHEM 237</td>
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#### Third Year

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1. Students seeking teacher certification must take HIST 105 and HIST 106. Other students may choose HIST 105 and HIST 106 or any 6 hours of American history courses (3 hours may be in Texas history).

2. Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

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### Directed Electives

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<td>BIOL 352</td>
<td>Diagnostic Bacteriology</td>
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<td>BIOL 414</td>
<td>Developmental Biology</td>
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<td>BIOL 430</td>
<td>Biological Imaging</td>
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<td>BIOL 450/</td>
<td>Genomics</td>
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<td>BICH 450</td>
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<td>BIOL 461</td>
<td>Antimicrobial Agents</td>
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<td>BESC 401</td>
<td>Bioenvironmental Microbiology</td>
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<td>BESC 402</td>
<td>Microbial Processes in Bioremediation</td>
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<tr>
<td></td>
<td><strong>Environmental Microbiology</strong></td>
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<tr>
<td>BIOL 352</td>
<td>Diagnostic Bacteriology</td>
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<td>BIOL 430</td>
<td>Biological Imaging</td>
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<td>SCSC 405</td>
<td>Soil and Water Microbiology</td>
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<td>BESC 401</td>
<td>Bioenvironmental Microbiology</td>
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<tr>
<td>BESC 402</td>
<td>Microbial Processes in Bioremediation</td>
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3 Two courses in the major must be designated as writing intensive.

4 Select from any 100-499 course not used elsewhere. (Except AGLS 101, BIMS 101; BIOL 101, BIOL 107, BIOL 113, BIOL 206; BUSN 100; CAEN 106, CHEM 116; HORT 101; MATH 102; STLC 100-499; WFSC 101.) Only one KINE 199 may be used as a general elective.

5 Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

### Molecular and Cell Biology - BS

Students who select Molecular and Cell Biology as their major will receive a strong background in the cellular and molecular aspects of biology with particular emphasis on eukaryotes. The major provides an excellent foundation for a career in biotechnology, genetic engineering, MD/PhD programs or basic biological research.

### Program Requirements

#### First Year

<table>
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<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tbody>
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<td>CHEM 101</td>
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<td>&amp; CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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</tr>
<tr>
<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>Communication elective (p. 22)</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Semester</th>
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<tbody>
<tr>
<td>Spring</td>
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<table>
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<tr>
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<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 112</td>
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<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<td>&amp; CHEM 112</td>
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<td>MATH 148</td>
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<table>
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<tr>
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
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<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
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<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
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<tr>
<td>American history elective (p. 25)</td>
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<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>14</td>
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</tbody>
</table>
The following are CBK courses and must be completed prior to the start of 5th full semester: BIOL 111, BIOL 112, BIOL 213, BIOL 214, CHEM 101 & CHEM 111, CHEM 102 & CHEM 112, CHEM 227 & CHEM 237, CHEM 228 & CHEM 238, MATH 147, MATH 148.

### Directed Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 430</td>
<td>Biological Imaging</td>
<td>4</td>
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<tr>
<td>VIBS 343</td>
<td>Histology</td>
<td>4</td>
</tr>
<tr>
<td>VIBS 443</td>
<td>Biology of Mammalian Cells and Tissues</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one course from the following:
- Any 300-400 level BIOL course (p. 741)
- Any 300-400 level BUSN course
- Any 300-400 level CHEM course
- Any 300-400 level MATH course
- Any 300-400 level PHYW course

Select remaining courses from the following:

#### Cell Biology
- BIOL 388 Principles of Animal Physiology 4
- BIOL 434/436 Principles of Evolution 4
- BIOL 437/439 Comparative Animal Behavior 4
- BIOL 445/447 Medical Microbiology 4
- BIOL 450/452 Advanced Plant Physiology 4
- BIOL 454/456 Medical Microbiology 4

#### Organismal Biology
- BIOL 388 Principles of Animal Physiology 4
- BIOL 434/436 Principles of Evolution 4
- BIOL 437/439 Comparative Animal Behavior 4
- BIOL 445/447 Medical Microbiology 4
- BIOL 450/452 Advanced Plant Physiology 4

#### Molecular and Computational Biology
- BIOL 406/408 Molecular and Computational Biology 4
- BIOL 410/412 Molecular and Computational Biology 4
- BIOL 414/416 Molecular and Computational Biology 4
- BIOL 418/420 Molecular and Computational Biology 4

#### Microbiology
- BIOL 406/408 Molecular and Computational Biology 4
- BIOL 410/412 Molecular and Computational Biology 4
- BIOL 414/416 Molecular and Computational Biology 4
- BIOL 418/420 Molecular and Computational Biology 4

Total Program Hours 120
Zoology - BS

The Zoology degree program is designed to expose students to all aspects of the study of animals. Following foundation courses on the principles of vertebrate and invertebrate zoology, students may select from a broad range of classes in animal biology, ranging from cellular and developmental biology, physiology, and anatomy to ecology and evolution. Graduates enter into advanced studies in zoology, specialized zoological fields in agriculture and renewable resources, or such professional fields as medicine, veterinary medicine, dentistry and other health-related areas.

Program Requirements

First Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>Communication elective (p. 22)</td>
<td></td>
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</table>

Second Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 227 &amp; CHEM 237</td>
<td>Organic Chemistry I and Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>American history elective (p. 25)</td>
<td></td>
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Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 228 &amp; CHEM 238</td>
<td>Organic Chemistry II and Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>American history elective (p. 25)</td>
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Third Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BICH 410 &amp; BICH 412</td>
<td>Comprehensive Biochemistry I and Biochemistry Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 318</td>
<td>Chordate Anatomy</td>
<td>4</td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>Elective ²</td>
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Spring

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 388</td>
<td>Principles of Animal Physiology</td>
<td>4</td>
</tr>
<tr>
<td>GENE 302 &amp; GENE 312</td>
<td>Principles of Genetics and Comprehensive Genetics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>Social and behavioral science elective (p. 25)</td>
<td></td>
<td>3</td>
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Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<tr>
<td>Selected a directed elective from the list below ⁵</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Creative arts elective (p. 24)</td>
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<td>3</td>
</tr>
<tr>
<td>Electives ³</td>
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</table>

Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 335</td>
<td>Invertebrate Zoology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 466</td>
<td>Principles of Evolution</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Selected a directed elective from the list below ⁵</td>
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Directed Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 344</td>
<td>Embryology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 413</td>
<td>Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 423</td>
<td>Cell Biology Laboratory</td>
<td>1</td>
</tr>
</tbody>
</table>

¹ Students seeking teacher certification must take HIST 105 and HIST 106. Other students may choose HIST 105 and HIST 106 or any 6 hours of American history courses (3 hours may be in Texas history).

² Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

The following are CBK courses and must be completed prior to the start of 5th full semester: BIOL 111, BIOL 112, BIOL 213, BIOL 214, CHEM 101 & CHEM 111, CHEM 102 & CHEM 112, CHEM 227 & CHEM 237, CHEM 228 & CHEM 238, MATH 147, MATH 148.
scales (Satellites/UAVs, hyper-spectral imaging, GPS, MRI, confocal and two photon microscopy, x-ray crystallography, etc.). Concomitant with, and underlying these advances, has been a revolution in information technology in which we have seen ever accelerating computational processing speeds and ever more massive data sets. These changes are driving a fundamental transformation of the biological sciences. In order to provide our students with the educational foundation they need to not just flourish, but to lead in this dramatically altered environment, we are offering a minor in the area of Bioinformatics to provide effective training at the interface of biological applications and computational tools. While students will be trained using the most advanced tools and applications available, the minor will focus on core concepts and approaches, to provide a durable skill set that can be applied to new tools and applications that will inevitably develop. The core curriculum of the minor will cover the essentials of effective computation, as well as the handling, exploration and utilization of large data sets.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 430</td>
<td>Biological Imaging</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 434/</td>
<td>Regulatory and Behavioral</td>
<td>3</td>
</tr>
<tr>
<td>NRSC 434</td>
<td>Neuroscience</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Laboratory for Regulatory and Behavioral Neuroscie</td>
<td>1</td>
</tr>
<tr>
<td>GENE 431/</td>
<td>Molecular Genetics</td>
<td>3</td>
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**Ecology/Evolution**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
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<td>Ecology</td>
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<td>BIOL 358</td>
<td>Ecology Laboratory</td>
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<tr>
<td>BIOL 440</td>
<td>Marine Biology</td>
<td>4</td>
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<tr>
<td>BIOL 467</td>
<td>Integrative Animal Behavior</td>
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<tr>
<td>ENTO 313</td>
<td>Biology of Insects</td>
<td>3</td>
</tr>
<tr>
<td>GENE 412</td>
<td>Population and Ecological Genetics</td>
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<tr>
<td>WFSC 311</td>
<td>Ichthyology</td>
<td>3</td>
</tr>
<tr>
<td>WFSC 315</td>
<td>Herpetology</td>
<td>3</td>
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<tr>
<td>WFSC 401</td>
<td>General Mammalogy</td>
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<tr>
<td>WFSC 402</td>
<td>General Ornithology</td>
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<tr>
<td>WFSC 422</td>
<td>Ethology</td>
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**Physiology/Neuroscience**

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<tr>
<td>BIOL 405</td>
<td>Comparative Endocrinology</td>
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<tr>
<td>BIOL 413</td>
<td>Cell Biology</td>
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<tr>
<td>BIOL 423</td>
<td>Cell Biology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 434/</td>
<td>Regulatory and Behavioral</td>
<td>3</td>
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<tr>
<td>NRSC 434</td>
<td>Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 435</td>
<td>Laboratory for Regulatory and Behavioral Neuroscie</td>
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<tr>
<td>BIOL 454</td>
<td>Immunology</td>
<td>3</td>
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<tr>
<td>GENE 431/</td>
<td>Molecular Genetics</td>
<td>3</td>
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<tr>
<td>WFSC 422</td>
<td>Ethology</td>
<td>3</td>
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**Preveterinary Medicine**

<table>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 351</td>
<td>Fundamentals of Microbiology</td>
<td>4</td>
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<tr>
<td>NUTR 303/</td>
<td>Principles of Animal Nutrition</td>
<td>3</td>
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<tr>
<td>ANSC 303</td>
<td></td>
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</tbody>
</table>

3 Select from any 100-499 course not used elsewhere. (Except AGLS 101, BIMS 101; BIOL 101, BIOL 107, BIOL 113, BIOL 206; BUSN 100; CAEN 101-499 (p. 751); CAEX 100-499; CHEM 106, CHEM 116; HORT 101; MATH 102; STLC 100-499 (p. 972); WFSC 101.) Only one KINE 199 may be used as a general elective.

4 Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

5 Two courses in the major must be designated as writing intensive.

In order to qualify for the secondary provisional teaching certificate, see requirements listed in the College of Education and Human Development section under secondary certification.

**Bioinformatics - Minor**

**Overview**

In the early 21st century we have gained the ability to decipher and manipulate the genetic information of organisms. We have also seen dramatic advances in imaging technologies from the macro to nano
Biology - Minor

A minor in Biology should represent coursework taken in the discipline beyond courses that might be used to satisfy core curriculum science requirements (8 credits). Therefore, though BIOL 111 and BIOL 112 are prerequisites to all of the listed courses, they are not considered part of the minor program. The coursework listed represents various sub-disciplines within the field of Biology and would give the student an overall knowledge base fitting a Minor in Biology.

Program Requirements

Students must have a C average in all courses taken for a minor in Biology. BIOL 484, BIOL 491 and BIOL 485 credits will not be allowed to count for the minor, nor used in the Biology GPA calculation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>Required Courses</td>
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<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
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<tr>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 351</td>
<td>Fundamentals of Microbiology</td>
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</tr>
<tr>
<td>Upper Level Biology</td>
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<td>Select two of the following:</td>
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<tr>
<td>300-400 level BIOL course (p. 741)</td>
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<tr>
<td>GENE 302</td>
<td>Principles of Genetics</td>
<td></td>
</tr>
<tr>
<td>&amp; GENE 312</td>
<td>and Comprehensive Genetics Laboratory</td>
<td></td>
</tr>
<tr>
<td>OCNG 420</td>
<td>Biological Oceanography</td>
<td></td>
</tr>
<tr>
<td>BICH 464</td>
<td>Bacteriophage Genomics</td>
<td></td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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</tr>
</tbody>
</table>

Department of Chemistry

An understanding of chemistry is critical to an understanding of life and its associated activities. Chemistry and chemical principles profoundly influence the way we live, communicate, and interact with one another, so it is little wonder that a strong background in chemistry provides a solid foundation for a variety of careers of major importance in the twenty-first century. Chemistry is uniquely positioned at the crossroad between the biological and physical sciences. By exploiting their understanding of both realms, chemists and other professionals with strong backgrounds in chemistry have made, and continue to make, major contributions to improve the human condition. Major technological and biological discoveries almost always depend on a fundamental understanding of chemistry and the pursuit of these discoveries, as a way to improve the world in which we live, drives those who seek to be a part of the process.

The Department of Chemistry offers coursework and research in all the major areas of chemistry, organized into programs leading to the degrees of Bachelor of Arts and Bachelor of Science. Both degree programs are suitable as terminal degree programs as well as for preparation for more advanced study in chemistry and related areas or as preparation for many professional programs in a variety of career fields. The BS program is more rigorous with respect to required mathematics and chemistry courses. It is particularly appropriate for those students who plan a career in the chemical industry or who intend to pursue advanced degrees in chemistry, biochemistry, chemical physics or forensics. An attractive number of free electives in this degree program allows students to take courses in interdisciplinary focus areas. The BA program offers the greatest degree of flexibility for students who see chemistry as a springboard into a related career field such as medicine, pharmacy, law, science writing, teaching or business for example. Chemistry majors are counseled by PhD chemistry faculty advisors fully familiar with the many options available in the chemistry and other departments, so as to optimize each student’s program of study to meet individual needs. The Department of Chemistry (http://chem.tamu.edu) website provides additional information about the degree plans, advising, and career opportunities for chemistry majors.

Although students may choose a variety of electives and/or minors in either the BA or BS degree programs, the following chemistry tracks have been developed to guide students in choosing electives.

Chemistry Tracks

In addition to the traditional BS degree (which allows for optional minors) and the traditional BA degree (minor required), the Department of Chemistry offers five tracks to guide students in their selection of electives for particular career paths in biological chemistry, environmental chemistry, chemical education, medicine, dentistry and pharmacy. A traditional minor requires that all minor courses must be taken from the same department and approved by the department granting the minor. These tracks provide the student an opportunity to replace a traditional minor with a broad spectrum of elective courses focused, not in a single department, but in an area of emphasis. A list of the recommended elective courses for each track may be obtained from the Office of the Undergraduate Advisor in Room 104 Chemistry Building or from the Department of Chemistry (http://chem.tamu.edu) website.

Cooperative Education Program in Chemistry

Under suitable circumstances, chemistry majors may participate in a cooperative education program in which the student alternates periods of attendance at the University with periods of employment in industry. This year-round cooperative program of college study and industrial experience is educationally enriching and meaningful, and also has the benefit of providing substantial financial assistance to the student without unduly prolonging the completion of the BS or BA degree program.

Faculty

Banerjee, Sarbajit, Professor
Chemistry
PHD, State University of New York at Stony Brook, 2004

Barondeau, David P, Associate Professor
Chemistry
PHD, Texas A&M University, 1996

Batteas, James D, Professor
Chemistry
PHD, University of California, Berkeley, 1995

Begley, Tadhg P, Distinguished Professor
Chemistry
PHD, California Institute of Technology, 1983

Bergbreiter, David E, Professor
Chemistry
PHD, Massachusetts Institute of Technology, 1974
Nippe, Michael, Assistant Professor
Chemistry
PHD, University of Wisconsin - Madison, 2011

North, Simon W, Professor
Chemistry
PHD, University of California, Berkeley, 1995

Ozerov, Oleg V, Professor
Chemistry
PHD, University of Kentucky, 2000

Pennington, James D, Instructional Associate Professor
Chemistry
PHD, University of Michigan, 1998

Ponnampерума, Krishan, Senior Lecturer
Chemistry
PHD, University of Cambridge, 1992

Potts, Jessica L, Lab Instructor
Chemistry
MS, Texas State University, 2014

Powers, David C, Assistant Professor
Chemistry
PHD, Harvard University, 2011

Powers, Tamara M, Lecturer
Chemistry
PHD, Harvard University, 2013

Rauschel, Frank M, Distinguished Professor
Chemistry
PHD, University of Wisconsin - Madison, 1976

Rosynék, Michael P, Professor
Chemistry
PHD, Rice University, 1972

Russell, David H, Professor
Chemistry
PHD, University of Nebraska - Lincoln, 1978

Santander, Patricio J, Senior Lecturer
Chemistry
PHD, Texas A&M University, 1987

Schaefer, Amber J, Lecturer
Chemistry
PHD, Rice University, 2007

Schweikert, Emilie A, Professor
Chemistry
PHD, Universite de Paris, France, 1964

Scott, Kevin W, Lab Instructor
Chemistry
PHD, Texas A&M University, 2016

Szczeński, Jonathan T, Assistant Professor
Chemistry
PHD, Johns Hopkins University, 2010

Sheldon, Matthew T, Assistant Professor
Chemistry
PHD, University of California, Berkeley, 2010

Singleton, Daniel A, Professor
Chemistry
PHD, University of Minnesota, Twin Cities, 1986

Son, Dong H, Professor
Chemistry
PHD, The University of Texas at Austin, 2002

Waas, Jack R, Lecturer
Chemistry
PHD, University of Michigan, 1997

Watanabe, Coran M, Associate Professor
Chemistry
PHD, Johns Hopkins University, 1998

Werke, Carrie B, Lab Instructor
Chemistry
MS, Texas A&M University, 2014

Williamson, Vickie M, Instructional Professor
Chemistry
PHD, University of Oklahoma, 1992

Wooley, Karen L, Distinguished Professor
Chemistry
PHD, Cornell University, 1993

Yeager, Danny L, Professor
Chemistry
PHD, California Institute of Technology, 1975

Yennello, Sherry J, Professor
Chemistry
PHD, Indiana University, 1990

Zhou, Hongcai J, Professor
Chemistry
PHD, Texas A&M University, 2000

**Majors**

- Bachelor of Arts in Chemistry (p. 600)
- Bachelor of Arts in Chemistry, Biological Chemistry or Medical, Dental, Pharmacy School Track (p. 602)
- Bachelor of Arts in Chemistry, Chemical Education Track (p. 603)
- Bachelor of Arts in Chemistry, Environmental Chemistry Track (p. 605)
- Bachelor of Science in Chemistry (p. 607)
- Bachelor of Science in Chemistry, Biological Chemistry Track (p. 609)
- Bachelor of Science in Chemistry, Environmental Chemistry Track (p. 610)

**Minors**

- Minor in Chemistry (p. 612)
Chemistry - BA

The Bachelor of Arts program, through the availability of a generous number of electives, gives the student a firm and broadly based foundation in chemistry, with the option of pursuing other educational objectives involving specialization in at least one other field in depth. This objective is accomplished by means of the BA program flexibility and by the inclusion of a minor area of study in another discipline or completion of a track as outlined above. Additional elective hours allow further diversification.

The BA degree offers somewhat more flexibility than the BS program, in terms of tailoring a program of study that combines chemistry with an interest in subject areas such as biochemistry, biology, business, computer science, education, forensics, medicine or physics. Although the BA program may in any specific case turn out to be a somewhat less technical curriculum, it meets the needs of many students who plan to use chemistry as a springboard to a career in chemical sales, marketing, law, technical writing, teaching at a pre-college level, science journalism, etc., to name only a few possibilities.

A BA degree in Chemistry coupled with a minor in Biology, or completion of a biological chemistry track, is excellent preparation for a variety of careers in the health-related disciplines. In particular, a BA degree in Chemistry is excellent and proven preparation for medical and dental schools, and affords the superior student the opportunity to maintain flexibility for a broad spectrum of medical or dental careers.

Although not required for the BA program, abundant research opportunities are available to students. The BA program also permits and encourages non-technical elective courses.

Program Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
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<tr>
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<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>CHEM 103 &amp; CHEM 113</td>
<td>Structure and Bonding and Physical and Chemical Principles</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>History of the United States</td>
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<td>Chemistry of the Elements and Qualitative Analysis</td>
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<td><strong>Fall</strong></td>
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<td>CHEM 231</td>
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<td>State and Local Government</td>
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<td>Language, philosophy and culture (p. 23)</td>
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<td>International and cultural diversity (p. 40)</td>
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<td>CHEM 491</td>
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<td>Organic Chemistry II</td>
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<td>CHEM 234</td>
<td>Organic Synthesis and Analysis IV</td>
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<td>Electricity and Optics</td>
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<td>American National Government</td>
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<td>CHEM 491</td>
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<td>Fundamentals of Quantitative Analysis</td>
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<td>CHEM 318</td>
<td>Quantitative Analysis Laboratory</td>
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<td>CHEM 327</td>
<td>Physical Chemistry I</td>
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Spring
CHEM 325  Physical Chemistry Laboratory I 1
CHEM 328  Physical Chemistry II 3
Select four of the following: 3 12

Communication (p. 22)
Language, philosophy and culture (p. 23)
Creative arts (p. 24)
Social and behavioral sciences (p. 25)
International and cultural diversity (p. 40)
Course for Minor
Chemistry track course
CHEM 485  Directed Studies
CHEM 491  Research

Semester Credit Hours 16

Fourth Year
Fall
CHEM 326  Physical Chemistry Laboratory II 1
CHEM 481  Seminar 2
Select one of the following: 3 9

Communication (p. 22)
Language, philosophy and culture (p. 23)
Creative arts (p. 24)
Social and behavioral sciences (p. 25)
International and cultural diversity (p. 40)
Course for Minor
Chemistry track course
CHEM 485  Directed Studies
CHEM 491  Research

Semester Credit Hours 12

Total Semester Credit Hours 120

1 Choose a section designated for chemistry majors.
2 Students may substitute any 6 hours of American history courses approved by the University Core Curriculum to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106.
These electives must include 12 hours which meet the language, philosophy and culture (3 hours), creative arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Additional elective hours must be used to complete a required minor approved by the granting department or students must satisfy the requirements of one of the approved chemistry track programs. BA chemistry majors may take CHEM 485 or CHEM 491 as elective courses. The total hours of CHEM 485 and CHEM 491 taken on a graded (A-F) basis may not exceed 9. Additional hours of these courses may be taken on an S/U basis. A maximum of 6 hours of these courses may be included on the degree plan. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.

This is a designated C- or W-course.

Chemistry - BA, Biological Chemistry or Medical, Dental, Pharmacy School Track

Many students planning to enter medical, dental, or pharmacy school prefer a bachelor of arts degree that contains a large number of elective courses that may be used to satisfy pre-professional school requirements. With that in mind, this track recommends an effective way to use some of the available free electives in the BA chemistry program to satisfy the pre-professional requirements for these programs. Courses in anatomy, biochemistry, biology, genetics, and microbiology are recommended. Additional free electives, of which there will be many, may be used to strengthen the student’s program of study in a manner decided by the student and the academic advisor.

Program Requirements

First Year

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<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>Fall</td>
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<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>CHEM 103 &amp; CHEM 113</td>
<td>Structure and Bonding and Physical and Chemical Principles</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>HIST 105</td>
<td>History of the United States</td>
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<td>MATH 151 or MATH 171</td>
<td>Engineering Mathematics I or Analytic Geometry and Calculus</td>
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Second Year

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<td>Organic Chemistry I</td>
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<td>CHEM 231</td>
<td>Techniques of Organic Chemistry</td>
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<td>BIOS 112</td>
<td>Introductory Biology II</td>
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<td>State and Local Government</td>
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<td>International and cultural diversity (p. 40)</td>
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Third Year

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<tr>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<td>BIOS 351 or VTPB 405</td>
<td>Fundamentals of Microbiology or Biomedical Microbiology</td>
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<td>GENE 301 &amp; GENE 312 or GENE 320/ BIMS 320</td>
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### Creative arts (p. 24)
Social and behavioral sciences (p. 25)
International and cultural diversity (p. 40)

**Course for Minor**

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>CHEM 491</td>
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**Semester Credit Hours** 15

### Spring

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<td>BIOL 319</td>
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<td>Chordate Anatomy</td>
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**Semester Credit Hours** 13

### Fourth Year

### Fall

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<td>BIOL 320</td>
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<td>BIOL 388</td>
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**Semester Credit Hours** 16

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<td>CHEM 485</td>
<td>Directed Studies</td>
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<td>CHEM 491</td>
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</table>

**Semester Credit Hours** 15

**Total Semester Credit Hours** 120

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1. Select a section designated for chemistry majors.
2. Students may substitute any 6 hours of American history courses approved by the University Core Curriculum (p. 21) to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106.
3. These electives must include 12 hours which meet the language, philosophy and culture (3 hours), creative arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum (p. 21). In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to the previous 12 hours of University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Additional elective hours must be used to complete a required minor approved by the granting department or students must satisfy the requirements of one of the approved chemistry track programs. BA chemistry majors may take CHEM 485 or CHEM 491 as elective courses. The total hours of CHEM 485 and CHEM 491 taken on a graded (A-F) basis may not exceed 9. Additional hours of these courses may be taken on an S/U basis. A maximum of 6 hours of these courses may be included on the degree plan. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.
4. This is a designated C- or W-course.

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### Chemistry - BA, Chemical Education Track

The chemical education track provides the student an opportunity to obtain secondary teacher certification in addition to completion of the requirements for a degree in chemistry. Many students who plan to become high school chemistry teachers or to pursue a master's degree in chemical education will find this track attractive. Students must complete the requirements for secondary teacher certification as defined by the College of Education and Human Development (consultation with the College of Education and Human Development is required).
# Program Requirements

## First Year

### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
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<td>Select one of the following:</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<td>CHEM 102 &amp; CHEM 112</td>
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<td>HIST 104 &amp; CHEM 114</td>
<td>Chemistry of the Elements and Qualitative Analysis</td>
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<tr>
<td>MATH 152 or MATH 172</td>
<td>Engineering Mathematics II or Calculus</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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</table>

Semester Credit Hours: 14

### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 100</td>
<td>Horizons in Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 103 &amp; CHEM 113</td>
<td>Structure and Bonding and Physical and Chemical Principles</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the United States</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151 or MATH 171</td>
<td>Engineering Mathematics I or Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Chemical Education Track Elective</td>
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<tr>
<td>SCEN 201</td>
<td>Self-Directed Experiences with Adolescents</td>
<td>1</td>
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</table>

Semester Credit Hours: 16

## Second Year

### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>1</td>
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<td>CHEM 234</td>
<td>Organic Synthesis and Analysis IV</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<tr>
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<tr>
<td>RDNG 465</td>
<td>Reading in the Middle and Secondary Grades</td>
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Semester Credit Hours: 16

### Fall

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<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 231</td>
<td>Techniques of Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
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<tr>
<td>INST 210</td>
<td>Understanding Special Populations</td>
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Semester Credit Hours: 15

## Third Year

### Spring

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<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 325</td>
<td>Physical Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 328</td>
<td>Physical Chemistry II</td>
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</table>

## Fourth Year

### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 325</td>
<td>Physical Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 328</td>
<td>Physical Chemistry II</td>
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### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 326</td>
<td>Physical Chemistry Laboratory II</td>
<td>1</td>
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<tr>
<td>CHEM 481</td>
<td>Seminar</td>
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<tr>
<td>Chemical Education Track Elective</td>
<td></td>
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</tr>
<tr>
<td>TEFB 406</td>
<td>Science in the Middle and Secondary School</td>
<td>4</td>
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</table>

Semester Credit Hours: 15

Select one of the following: 3

- CHEM 317 Quantitative Analysis & CHEM 320 and Instrumental Analysis Laboratory
- CHEM 362 Descriptive Inorganic Chemistry
- CHEM 415 Analytical Chemistry
- CHEM 446 Organic Chemistry III
- CHEM 456 Chemical Biology
- CHEM 462 Inorganic Chemistry
- CHEM 464 Nuclear Chemistry
- CHEM 466 Polymer Chemistry
- CHEM 468 Materials Chemistry of Inorganic Materials
- CHEM 470 Industrial Chemistry
- CHEM 483 Green Chemistry
- CHEM 489 Special Topics in...
- BICH 410 Comprehensive Biochemistry I
- BICH 411 Comprehensive Biochemistry II
- BICH 440 Biochemistry I
- BICH 441 Biochemistry II

## Chemical Education Track Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEFB 324</td>
<td>Teaching Skills II</td>
<td>3</td>
</tr>
<tr>
<td>Select two of the following:</td>
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<td>6</td>
</tr>
<tr>
<td>Communication (p. 22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td></td>
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</table>

## Course for Minor

Select one of the following: 3

- CHEM 317 Quantitative Analysis & CHEM 320 and Instrumental Analysis Laboratory
- CHEM 362 Descriptive Inorganic Chemistry
- CHEM 415 Analytical Chemistry
- CHEM 446 Organic Chemistry III
- CHEM 456 Chemical Biology
- CHEM 462 Inorganic Chemistry
- CHEM 464 Nuclear Chemistry
- CHEM 466 Polymer Chemistry
- CHEM 468 Materials Chemistry of Inorganic Materials
- CHEM 470 Industrial Chemistry
- CHEM 483 Green Chemistry
- CHEM 489 Special Topics in...
- BICH 410 Comprehensive Biochemistry I
- BICH 411 Comprehensive Biochemistry II
- BICH 440 Biochemistry I
- BICH 441 Biochemistry II

## Minor Course

Select one of the following: 3

- CHEM 317 Quantitative Analysis & CHEM 320 and Instrumental Analysis Laboratory

## Semester Credit Hours

- First Year: 14
- Second Year: 16
- Third Year: 15
- Fourth Year: 15
- Total: 68
CHEM 362  Descriptive Inorganic Chemistry
CHEM 415  Analytical Chemistry
CHEM 446  Organic Chemistry III
CHEM 456  Chemical Biology
CHEM 462  Inorganic Chemistry
CHEM 464  Nuclear Chemistry
CHEM 466  Materials Chemistry of Inorganic Materials
CHEM 470  Industrial Chemistry
CHEM 483  Green Chemistry
CHEM 489  Special Topics in...
BICH 410  Comprehensive Biochemistry I
BICH 411  Comprehensive Biochemistry II
BICH 440  Biochemistry I
BICH 441  Biochemistry II

Select two of the following: 5
Communication (p. 22)
Creative arts (p. 24)
Course for Minor

Semester Credit Hours  15
Total Semester Credit Hours  120

1 Select a section designated for chemistry majors.
2 Students may substitute any 6 hours of American history courses approved by the University Core Curriculum to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106.
3 This is a designated C- or W-course.
4 These electives must include 12 hours which meet the language, philosophy and culture (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum). In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Additional elective hours must be used to complete a required minor approved by the granting department or students must satisfy the requirements of one of the approved chemistry track programs. BA chemistry majors may take CHEM 485 or CHEM 491 as elective courses. The total hours of CHEM 485 and CHEM 491 taken on a graded (A-F) basis may not exceed 9. Additional hours of these courses may be taken on an S/U basis. A maximum of 6 hours of these courses may be included on the degree plan. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.

Chemistry - BA, Environmental Chemistry Track

This environmental chemistry track contains a very large number of elective courses and provides even greater opportunity for students to select electives which provide for a career focus in environmental chemistry. The large number of electives makes it possible for students to combine interests in environmental issues with other interests such as business, law, and politics. Electives may be chosen from recommended courses in atmospheric sciences, bioenvironmental science, biology, geography, geology, geosciences, microbiology and oceanography.

Program Requirements

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 100  Horizons in Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101  &amp; CHEM 111 Fundamentals of Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM 103  &amp; CHEM 113 Structure and Bonding and Physical and Chemical Principles</td>
<td></td>
</tr>
<tr>
<td>ENGL 104  Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>HIST 105  History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>MATH 151  or MATH 171 Engineering Mathematics I</td>
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</tr>
<tr>
<td>or MATH 172  Engineering Mathematics II or Calculus</td>
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</table>

Semester Credit Hours  15

Spring

Select one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 102  &amp; CHEM 112 Fundamentals of Chemistry II</td>
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</tr>
<tr>
<td>CHEM 104  &amp; CHEM 114 Chemistry of the Elements and Qualitative Analysis</td>
<td></td>
</tr>
<tr>
<td>HIST 106  History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>MATH 152  or MATH 172 Engineering Mathematics II or Calculus</td>
<td>4</td>
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</table>

Environmental Chemistry Track Elective

Select one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 363  Introduction to Atmospheric Chemistry and Air Pollution</td>
<td></td>
</tr>
<tr>
<td>BIOL 111  Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td>BIOL 112  Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td>GEOL 104  Physical Geology</td>
<td></td>
</tr>
<tr>
<td>OCNG 401  Interdisciplinary Oceanography</td>
<td></td>
</tr>
<tr>
<td>OCNG 410  Physical Oceanography</td>
<td></td>
</tr>
</tbody>
</table>

Semester Credit Hours  15

Second Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 227  Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 231  Techniques of Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 218  Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>POLS 207  State and Local Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Environmental Chemistry Track Elective

Select one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 363  Introduction to Atmospheric Chemistry and Air Pollution</td>
<td></td>
</tr>
<tr>
<td>BIOL 111  Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
</tr>
<tr>
<td>GEOL 104</td>
<td>Physical Geology</td>
</tr>
<tr>
<td>OCNG 401</td>
<td>Interdisciplinary Oceanography</td>
</tr>
<tr>
<td>OCNG 410</td>
<td>Physical Oceanography</td>
</tr>
</tbody>
</table>

| Semester Credit Hours | 16 |

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II ¹</td>
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<tr>
<td>CHEM 234</td>
<td>Organic Synthesis and Analysis IV ³</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following: 4

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

Course for Minor

| CHEM 485 | Directed Studies                   | 3                    |
| CHEM 491 | Research                            | 3                    |

| Semester Credit Hours | 16 |

**Third Year**

| Semester Credit Hours | 16 |

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 315</td>
<td>Fundamentals of Quantitative Analysis</td>
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</tr>
<tr>
<td>CHEM 318</td>
<td>Quantitative Analysis Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 327</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
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</table>

Environmental Chemistry Track Electives

Select three of the following: 9

- BIOL 214  Genes, Ecology and Evolution
- OCNG 420  Biological Oceanography
- GEOL 420  Environmental Geology
- GEOL 451  Introduction to Geochemistry
- BESC 403  Sampling and Environmental Monitoring
- GEOG 324  Global Climatic Regions
- GEOG 330  Resources and the Environment
- GEOG 370/ MARS 370  Coastal Processes
- GEOS 410  Global Change

| Semester Credit Hours | 16 |

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 325</td>
<td>Physical Chemistry Laboratory I</td>
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</tr>
<tr>
<td>CHEM 328</td>
<td>Physical Chemistry II</td>
<td>3</td>
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Environmental Chemistry Track Elective

Select two of the following: 6

- ATMO 363  Introduction to Atmospheric Chemistry and Air Pollution
- BIOL 111  Introductory Biology I
- BIOL 112  Introductory Biology II
- GEOL 104  Physical Geology
- OCNG 401  Interdisciplinary Oceanography
- OCNG 410  Physical Oceanography

Select two of the following: 4

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

Course for Minor

| CHEM 485 | Directed Studies                   | 3                    |
| CHEM 491 | Research                            | 3                    |

| Semester Credit Hours | 16 |

**Fourth Year**

| Semester Credit Hours | 14 |

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 326</td>
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<tr>
<td>CHEM 481</td>
<td>Seminar ³</td>
<td>2</td>
</tr>
</tbody>
</table>

Select one of the following: 3

- CHEM 317  Quantitative Analysis
- & CHEM 320  and Instrumental Analysis Laboratory
- CHEM 362  Descriptive Inorganic Chemistry
- CHEM 415  Analytical Chemistry
- CHEM 446  Organic Chemistry III
- CHEM 456  Chemical Biology
- CHEM 462  Inorganic Chemistry
- CHEM 464  Nuclear Chemistry
- CHEM 466  Polymer Chemistry
- CHEM 468  Materials Chemistry of Inorganic Materials
- CHEM 470  Industrial Chemistry
- CHEM 483  Green Chemistry
- CHEM 489  Special Topics in...
- BICH 410  Comprehensive Biochemistry I
- BICH 411  Comprehensive Biochemistry II
- BICH 440  Biochemistry I
- BICH 441  Biochemistry II
- PHYS 309  Modern Physics

Select two of the following: 8

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

Course for Minor

| CHEM 485 | Directed Studies                   | 3                    |
| CHEM 491 | Research                            | 3                    |

| Semester Credit Hours | 14 |

**Spring**

Select one of the following: 3

- CHEM 317  Quantitative Analysis
- & CHEM 320  and Instrumental Analysis Laboratory
- CHEM 362  Descriptive Inorganic Chemistry
- CHEM 415  Analytical Chemistry
- CHEM 446  Organic Chemistry III
- CHEM 456  Chemical Biology
- CHEM 462  Inorganic Chemistry
- CHEM 464  Nuclear Chemistry
- CHEM 466  Polymer Chemistry
Chemistry - BS

The BS program in Chemistry is arranged so that a student obtains a comprehensive, solid foundation in all of the major branches of chemistry, combined with a suitable measure of individual flexibility. The latter objective is met in part by a strong emphasis on involving the undergraduate BS chemistry major in exciting, innovative, state-of-the-art research programs. Most students in the BS program become involved in research during their junior year and continue this until graduation.

Students frequently receive research scholarships and fellowships, which include opportunities for summer research programs. It is not uncommon for an undergraduate chemistry major to be a coauthor of scientific publications in major research journals before graduation.

Undergraduate chemistry research activities involve substantial use of modern scientific equipment, including major instrumentation. The student involved in this activity also gains considerable insight into the profession by means of substantial individual contact with chemistry department faculty.

The BS degree in Chemistry is the appropriate program for students planning advanced degree programs in chemistry, biochemistry, forensics, chemical physics and other fields. Students planning careers in chemical industry should also choose the BS degree in Chemistry. Students may wish to choose electives suggested in the biological or environmental chemistry tracks. This degree program satisfies fully the accreditation requirements of the American Chemical Society.

Program Requirements

First Year

Fall Semester Credit Hours 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 100</td>
<td>Horizons in Chemistry</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td>CHEM 103</td>
<td>Structure and Bonding</td>
</tr>
<tr>
<td>&amp; CHEM 113</td>
<td>and Physical and Chemical Principles</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the United States</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
</tr>
<tr>
<td>or MATH 171</td>
<td>or Analytic Geometry and Calculus</td>
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</table>

Spring Semester Credit Hours 15

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<tr>
<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<td>CHEM 104</td>
<td>Chemistry of the Elements</td>
</tr>
<tr>
<td>&amp; CHEM 114</td>
<td>and Qualitative Analysis</td>
</tr>
<tr>
<td>HIST 106</td>
<td>History of the United States</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
</tr>
<tr>
<td>or MATH 172</td>
<td>or Calculus</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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</tbody>
</table>

Second Year

Fall Semester Credit Hours 15

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM 231</td>
<td>Techniques of Organic Chemistry</td>
</tr>
<tr>
<td>Select one of the following</td>
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<tr>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
</tr>
<tr>
<td>MATH 253</td>
<td>Engineering Mathematics III</td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
</tr>
</tbody>
</table>

**Spring**

<table>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
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</tr>
<tr>
<td>CHEM 234</td>
<td>Organic Synthesis and Analysis IV</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 362</td>
<td>Descriptive Inorganic Chemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- MATH 304  | Linear Algebra                              | 3            |
- MATH 308  | Differential Equations                     | 3            |
- STAT 211  | Principles of Statistics I                 | 3            |

MATH course approved by chemistry advisor (p. 885)

STAT course approved by chemistry advisor (p. 970)

Select one of the following:

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

**Third Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 315</td>
<td>Fundamentals of Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 318</td>
<td>Quantitative Analysis Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 327</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 433</td>
<td>Advanced Inorganic Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 325</td>
<td>Physical Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 328</td>
<td>Physical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three of the following:

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

**Fourth Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
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<tr>
<td>CHEM 326</td>
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<td>1</td>
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<td>CHEM 415</td>
<td>Analytical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 491</td>
<td>Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- CHEM 446  | Organic Chemistry III                      | 3            |
- CHEM 456  | Chemical Biology                           | 3            |

Select two of the following:

- Communication (p. 22)
- Language, philosophy and culture (p. 23)
- Creative arts (p. 24)
- Social and behavioral sciences (p. 25)
- International and cultural diversity (p. 40)

Total Semester Credit Hours 15

1. Select a section designated for chemistry majors.
2. Students may substitute any 6 hours of American history courses approved by the University Core Curriculum to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106.
3. This is a designated C- or W-course.
These electives must include 12 hours of courses which meet the language, philosophy and culture (3 hours), creative arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum (p. 21). In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to the previous 12 hours of University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor. Electives should be chosen in consultation with the chemistry advisor and should be selected to meet the residency requirement (36 hours at 300-400 level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.

The total hours of CHEM 485 and CHEM 491 taken by BS chemistry majors on a graded (A–F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis.

Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e., BICH 410 or BICH 440).

Chemistry - BS, Biological-Chemistry Track

The biological chemistry track has been designed for students interested in pursuing graduate study in biological chemistry, biochemistry, pharmacology or related fields or a career in the pharmaceutical industry. Students who wish to enter an MD/PhD program or medical, dental or pharmacy school will, in most cases, need to take an additional advanced biology course beyond those recommended for this track and should check the admission requirements for these programs with the Office of Professional School Advising. Courses in biology, biochemistry, genetics and statistics are recommended as electives.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
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Fall

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
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</tr>
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</table>

CHEM 100 Horizons in Chemistry

Select one of the following:

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
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</table>

CHEM 101 Fundamentals of Chemistry I
& CHEM 111 Fundamentals of Chemistry Laboratory I

CHEM 103 Structure and Bonding
& CHEM 113 and Physical and Chemical Principles

ENGL 104 Composition and Rhetoric

HIST 105 History of the United States

MATH 151 Engineering Mathematics I
or MATH 171 or Analytic Geometry and Calculus

Spring

<table>
<thead>
<tr>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

CHEM 102 Fundamentals of Chemistry II
& CHEM 112 and Fundamentals of Chemistry Laboratory II

Chemistry - BS, Biological-Chemistry Track

Second Year

Fall

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

CHEM 227 Organic Chemistry I

CHEM 231 Techniques of Organic Chemistry

Select one of the following:

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
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</table>

MATH 221 Several Variable Calculus

MATH 251 Engineering Mathematics III

MATH 253 Engineering Mathematics III

PHYS 208 Electricity and Optics

Spring

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
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</tbody>
</table>

CHEM 228 Organic Chemistry II

CHEM 234 Organic Synthesis and Analysis IV

CHEM 362 Descriptive Inorganic Chemistry

Select one of the following:

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
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</table>

STAT 211 Principles of Statistics I

STAT 302 Statistical Methods

MATH course approved by chemistry advisor (p. 885)

STAT course approved by chemistry advisor (p. 970)

Biological Chemistry Track Elective

BIOL 111 Introductory Biology I

<table>
<thead>
<tr>
<th>Credit Hours</th>
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<tbody>
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Third Year

Fall

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
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</tbody>
</table>

CHEM 315 Fundamentals of Quantitative Analysis

CHEM 318 Quantitative Analysis Laboratory

CHEM 327 Physical Chemistry I

CHEM 433 Advanced Inorganic Chemistry Laboratory

POLS 206 American National Government

Biological Chemistry Track Elective

BIOL 112 Introductory Biology II

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
</tbody>
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Spring

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

CHEM 325 Physical Chemistry Laboratory I

CHEM 328 Physical Chemistry II

POLS 207 State and Local Government

Biological Chemistry Track Elective

Select one of the following:

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
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</table>

GENE 301 Comprehensive Genetics

GENE 312 Comprehensive Genetics Laboratory

GENE 320/ BIMS 320 Biomedical Genetics

Select two of the following:

<table>
<thead>
<tr>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

Communication (p. 22)

Language, philosophy and culture (p. 23)
Chemistry - BS, Environmental Chemistry Track

Chemistry plays a major role in most environmental issues and this track recommends electives in a broad spectrum of courses designed to prepare students to address environmental problems from a variety of perspectives. Electives may be chosen from recommended courses in atmospheric sciences, bioenvironmental science, biology, geography, geology, microbiology and oceanography.

Program Requirements

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 100</td>
<td>Horizons in Chemistry</td>
<td>1</td>
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<tr>
<td>Select one of the following:</td>
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<td>4</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I &amp; Fundamentals of Chemistry Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 103 &amp; CHEM 113</td>
<td>Structure and Bonding and Physical and Chemical Principles</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>HIST 105</td>
<td>History of the United States</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151 or MATH 171</td>
<td>Engineering Mathematics I or Analytic Geometry and Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>120</td>
<td></td>
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</tbody>
</table>

Select one of the following: 4

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II &amp; Fundamentals of Chemistry Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 104 &amp; CHEM 114</td>
<td>Chemistry of the Elements and Qualitative Analysis</td>
<td>1</td>
</tr>
<tr>
<td>HIST 106</td>
<td>History of the United States</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152 or MATH 172</td>
<td>Engineering Mathematics II or Calculus</td>
<td>4</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

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3. This is a designated C- or W-course.

These electives must include 12 hours of courses which meet the language, philosophy and culture (3 hours), creative arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum (p. 21). (See page 17). In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to the previous 12 hours of University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor. Electives should be chosen in consultation with the chemistry advisor and should be selected to meet the residency requirement (36 hours at 300-400 level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.

The total hours of CHEM 485 and CHEM 491 taken by BS chemistry majors on a graded (A–F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis.

Creative arts (p. 24)
Social and behavioral sciences (p. 25)
International and cultural diversity elective (p. 40)

Semester Credit Hours 16

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 326</td>
<td>Physical Chemistry Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 415</td>
<td>Analytical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 491</td>
<td>Research 5</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
<td>1</td>
</tr>
<tr>
<td>BICH 440</td>
<td>Biochemistry I</td>
<td>1</td>
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<tr>
<td>Select two of the following: 4</td>
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<td>6</td>
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<tr>
<td>Communication (p. 22)</td>
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<td></td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative arts (p. 24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social and behavioral sciences (p. 25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International and cultural diversity (p. 40)</td>
<td></td>
<td></td>
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<tr>
<td>Total Semester Credit Hours</td>
<td>16</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 434</td>
<td>Analytical Instrumentation Laboratory</td>
<td>2</td>
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<tr>
<td>CHEM 481</td>
<td>Seminar 3</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 491</td>
<td>Research 5</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3</td>
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<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
<td>1</td>
</tr>
<tr>
<td>BICH 441</td>
<td>Biochemistry II</td>
<td>1</td>
</tr>
<tr>
<td>Select one of the following: 4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Communication (p. 22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language, philosophy and culture (p. 23)</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
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<td></td>
</tr>
<tr>
<td>International and cultural diversity (p. 40)</td>
<td></td>
<td></td>
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<tr>
<td>Total Semester Credit Hours</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

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3. This is a designated C- or W-course.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Second Year**

### Fall

- CHEM 227  Organic Chemistry I ¹ 3
- CHEM 231  Techniques of Organic Chemistry 2
- Select one of the following: 4
  - MATH 221  Several Variable Calculus
  - MATH 251  Engineering Mathematics III
  - MATH 253  Engineering Mathematics III
- PHYS 208  Electricity and Optics 4

**Semester Credit Hours**: 15

### Spring

- CHEM 228  Organic Chemistry II ¹ 3
- CHEM 234  Organic Synthesis and Analysis IV ³ 3
- CHEM 362  Descriptive Inorganic Chemistry 3
- Select one of the following: 3
  - MATH 304  Linear Algebra
  - MATH 308  Differential Equations
  - STAT 211  Principles of Statistics I
- MATH course approved by chemistry advisor (p. 885)
- STAT course approved by chemistry advisor (p. 970)
- Environmental Chemistry Track Elective

**Semester Credit Hours**: 13

### Third Year

### Fall

- CHEM 315  Fundamentals of Quantitative Analysis 3
- CHEM 318  Quantitative Analysis Laboratory 1
- CHEM 327  Physical Chemistry I 3
- CHEM 433  Advanced Inorganic Chemistry Laboratory 2
- POLS 206  American National Government 3
- Environmental Chemistry Track Elective

**Select one of the following**: 3
  - ATMO 363  Introduction to Atmospheric Chemistry and Air Pollution
  - BIOL 111  Introductory Biology I
  - BIOL 112  Introductory Biology II
  - GEOI 104  Physical Geology
  - OCNG 401  Interdisciplinary Oceanography
  - OCNG 410  Physical Oceanography

**Semester Credit Hours**: 15

### Spring

- CHEM 325  Physical Chemistry Laboratory I 1
- CHEM 328  Physical Chemistry II 3
- POLS 207  State and Local Government 3
- Environmental Chemistry Track Elective

**Select two of the following**: 6
  - BESC 403  Sampling and Environmental Monitoring
  - BIOL 214  Genes, Ecology and Evolution
  - GEOG 324  Global Climatic Regions
  - GEOG 330  Resources and the Environment
  - GEOG 370  Coastal Processes
  - GEOL 420  Environmental Geology
  - GEOL 451  Introduction to Geochemistry
  - OCNG 420  Biological Oceanography

**Semester Credit Hours**: 16

### Fourth Year

### Fall

- CHEM 326  Physical Chemistry Laboratory II 1
- CHEM 415  Analytical Chemistry 3
- CHEM 491  Research ⁶ 3

**Select one of the following**: 3
  - CHEM 446  Organic Chemistry III
  - CHEM 456  Chemical Biology
  - CHEM 462  Inorganic Chemistry
  - CHEM 464  Nuclear Chemistry
  - CHEM 466  Polymer Chemistry
  - CHEM 468  Materials Chemistry of Inorganic Materials
  - CHEM 470  Industrial Chemistry
  - CHEM 483  Green Chemistry
  - CHEM 489  Special Topics in...
  - BICH 410  Comprehensive Biochemistry I
  - BICH 411  Comprehensive Biochemistry II
  - BICH 440  Biochemistry I
  - BICH 441  Biochemistry II
  - PHYS 309  Modern Physics

**Select two of the following**: 6
  - Communication (p. 22)
  - Language, philosophy and culture (p. 23)
  - Creative arts (p. 24)
  - Social and behavioral sciences (p. 25)
  - International and cultural diversity (p. 40)

**Semester Credit Hours**: 16

### Spring

- CHEM 434  Analytical Instrumentation Laboratory 2
- CHEM 481  Seminar ³ 2
- CHEM 491  Research ⁵ 3

**Select one of the following**: 6
  - CHEM 446  Organic Chemistry III
CHEM 456  Chemical Biology
CHEM 462  Inorganic Chemistry
CHEM 464  Nuclear Chemistry
CHEM 466  Polymer Chemistry
CHEM 468  Materials Chemistry of Inorganic Materials
CHEM 470  Industrial Chemistry
CHEM 483  Green Chemistry
CHEM 489  Special Topics in...
BICH 410  Comprehensive Biochemistry I
BICH 411  Comprehensive Biochemistry II
BICH 440  Biochemistry I
BICH 441  Biochemistry II
PHYS 309  Modern Physics

Select two of the following: 4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
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<td>Communication (p. 22)</td>
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</tr>
<tr>
<td></td>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
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<tr>
<td></td>
<td>Creative arts (p. 24)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral sciences (p. 25)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>International and cultural diversity (p. 40)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>120</td>
</tr>
</tbody>
</table>

1. Select a section designated for chemistry majors.
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4. These electives must include 12 hours of courses which meet the language, philosophy and culture (3 hours), creative arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum (p. 21). (See page 17). In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to the previous 12 hours of University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor. Electives should be chosen in consultation with the chemistry advisor and should be selected to meet the residency requirement (36 hours at 300-400 level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.
5. The total hours of CHEM 485 and CHEM 491 taken by BS chemistry majors on a graded (A–F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis.
6. Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e., BICH 410 or BICH 440).

### Chemistry - Minor

Students seeking a minor in chemistry must complete the Declaration of Minor in Chemistry form and have it approved by the undergraduate advisor in chemistry (Room 104 Chemistry) and their academic advisor. A minor in Chemistry should represent course work taken in the discipline beyond courses that might be used to satisfy core curriculum science requirements (8 credits). Therefore, though CHEM 101/CHM 111 or CHEM 107 and CHEM 102/CHM 112 are prerequisites to all of the listed courses, they are not considered part of the minor program. The course work listed (17-20 credits) represents various sub-disciplines within the field of Chemistry and would give the student an overall knowledge base fitting a Minor in Chemistry. This is consistent with the statement on minors published by the American Chemical Society.

### Program Requirements

The student will choose FIVE lecture courses (14-15 credits) and THREE laboratory courses (3-5 credits) from categories A.-E. below. The student must take at least one course from FOUR of the FIVE categories. Students must have a C average in all courses taken for a minor in Chemistry. CHEM 491 and CHEM 485 credits will not be allowed to count for the minor nor used in the Chemistry GPA calculation. Substitution of courses without the CHEM prefix will not be allowed.

#### Code  Title  Semester Credit Hours

<table>
<thead>
<tr>
<th>A. Organic Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 227  Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM 237  Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>CHEM 228  Organic Chemistry II</td>
</tr>
<tr>
<td>CHEM 238  Organic Chemistry Laboratory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Analytical Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 315  Fundamentals of Quantitative Analysis</td>
</tr>
<tr>
<td>CHEM 316  Quantitative Analysis</td>
</tr>
<tr>
<td>CHEM 317  Quantitative Analysis</td>
</tr>
<tr>
<td>CHEM 318  Quantitative Analysis Laboratory</td>
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<tr>
<td>CHEM 320  Instrumental Analysis Laboratory</td>
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<table>
<thead>
<tr>
<th>C. Physical Chemistry</th>
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<tbody>
<tr>
<td>CHEM 322  Physical Chemistry for Engineers</td>
</tr>
<tr>
<td>CHEM 325  Physical Chemistry Laboratory I</td>
</tr>
<tr>
<td>CHEM 326  Physical Chemistry Laboratory II</td>
</tr>
<tr>
<td>CHEM 327  Physical Chemistry II</td>
</tr>
<tr>
<td>CHEM 328  Physical Chemistry II</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>D. Inorganic Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 220/ MSEN 220  Physics and Chemistry of Inorganic Materials</td>
</tr>
<tr>
<td>CHEM 362  Descriptive Inorganic Chemistry</td>
</tr>
<tr>
<td>CHEM 383  Chemistry of Environmental Pollution</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>E. Advanced Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 415  Analytical Chemistry</td>
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<tr>
<td>CHEM 433  Advanced Inorganic Chemistry Laboratory</td>
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<tr>
<td>CHEM 434  Analytical Instrumentation Laboratory</td>
</tr>
<tr>
<td>CHEM 446  Organic Chemistry III</td>
</tr>
<tr>
<td>CHEM 456  Chemical Biology</td>
</tr>
<tr>
<td>CHEM 462  Inorganic Chemistry</td>
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<tr>
<td>CHEM 464  Nuclear Chemistry</td>
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<tr>
<td>CHEM 466  Polymer Chemistry</td>
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</tbody>
</table>
CHEM 468  Materials Chemistry of Inorganic Materials  3
CHEM 470  Industrial Chemistry  3
CHEM 483  Green Chemistry  3
CHEM 489  Special Topics in...  1-4

Students may not count both CHEM 315 and CHEM 316
Students may not count both CHEM 322 and CHEM 327

Department of Mathematics

The Department of Mathematics offers curricula which lead to the following undergraduate degrees: Bachelor of Science in Applied Mathematical Sciences, Bachelor of Arts in Mathematics and Bachelor of Science in Mathematics. An Integrated Fast Track combined baccalaureate/graduate degree program is also offered.

The curriculum for the BS in Applied Mathematical Sciences includes courses in economics, industrial engineering, statistics, computer science and mathematics. A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to modern technological industries and/or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate programs. Advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

With carefully chosen electives in education, any one of the above three degree plans can lead to teacher certification. Students interested in teacher certification may find the BA degree plan the most suitable since this degree plan offers the greatest flexibility for the inclusion of teacher certification courses.

Faculty

Allen, Angela J, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 2005

Anshelevich, Michael V, Professor
Mathematics
PHD, University of California, Berkeley, 2000

Aurispa, Benjamin, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 2006

Austin, Amy L, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1994

Baskin, Dean R, Assistant Professor
Mathematics
PHD, Stanford University, 2010

Battle, Guy A, Professor
Mathematics
PHD, Duke University, 1977

Baudier, Florent P, Visiting Assistant Professor
Mathematics
PHD, Universite De Besancon, 2010

Belmonte, Arthur P, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1986

Berkolaiko, Gregory, Professor
Mathematics
PHD, University of Bristol, United Kingdom, 1997

Boas, Harold P, Professor
Mathematics
PHD, Massachusetts Institute of Technology, 1980

Bollinger, Kathryn L, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1998

Bonito, Andrea, Professor
Mathematics
PHD, Ecole Polytechnique Federale de Lausanne, France, 2006

Borosh, Itshak, Senior Professor
Mathematics
PHD, Weizmann Institute of Science, 1966

Brannan, Michael P, Assistant Professor
Mathematics
PHD, Queen's University, Canada, 2012

Bridy, Andrew D, Instructional Associate Professor
Mathematics
PHD, University of Wisconsin - Madison, 2014

Cai, Yue, Visiting Assistant Professor
Mathematics
PHD, University of Kentucky, 2016

Carter, Tamara A, Instructional Assistant Professor
Mathematics
PHD, Texas A&M University, 2005

Chen, Goong, Professor
Mathematics
PHD, University of Wisconsin - Madison, 1977

Comech, Andrew, Associate Professor
Mathematics
PHD, Columbia University, 1997

Daripa, Prabir, Associate Professor
Mathematics
PHD, Brown University, 1985

Demlow, Alan R, Professor
Mathematics
PHD, Cornell University, 2002

Devore, Ronald A, Distinguished Professor
Mathematics
PHD, The Ohio State University, 1967

Douglas, Ronald G, Distinguished Professor
Mathematics
PHD, Louisiana State University, 1962
Dykema, Kenneth J, Professor
Mathematics
PHD, University of California, Berkeley, 1993

Efendiev, Yalchin R, Professor
Mathematics
PHD, California Institute of Technology, 1999

Epstein, Janice L, Instructional Associate Professor
Mathematics
PHD, Texas A&M University, 1992

Erdelyi, Tamas, Professor
Mathematics
PHD, University of Southern Carolina, 1989

Foucart, Simon, Associate Professor
Mathematics
PHD, University of Cambridge, 2005

Fry, Erin K, Lecturer
Mathematics
MS, University of Illinois at Urbana-Champaign, 1990

Fulling, Stephen A, Professor
Mathematics
PHD, Princeton University, 1972

Geller, Susan C, Professor
Mathematics
PHD, Cornell University, 1975

Grigorchuk, Rostislav, Distinguished Professor
Mathematics
PHD, Lomonosov Moscow State University, 1986

Guermond, Jean-Luc, Professor
Mathematics
PHD, Sorbonne Universites, 1995

Gustafson, Robert A, Associate Professor
Mathematics
PHD, Yale University, 1979

Hanin, Boris, Assistant Professor
Mathematics
PHD, Northwestern University, 2014

Harris, Isaac, Visiting Assistant Professor
Mathematics
PHD, University of Delaware, 2015

Hester, Yvette C, Instructional Assistant Professor
Mathematics
PHD, Texas A&M University, 2000

Howard, Peter B, Professor
Mathematics
PHD, Indiana University, 1998

Johnson, William B, Distinguished Professor
Mathematics
PHD, Iowa State University, 1969

Jung, Junehyuk, Assistant Professor
Mathematics
PHD, Princeton University, 2013

Kahlig, Joseph E, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1994

Kerr, David G, Professor
Mathematics
PHD, University of Toronto, 2001

Kilmer, Kendra R, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 2003

Kim, Joung Dong, Instructional Assistant Professor
Mathematics
PHD, State University of New York at Stony Brook, 2012

Klein, Gregory S, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1992

Kuchment, Peter, Distinguished Professor
Mathematics
PHD, Kharkov State University, Russia, 1973

Lahodny, Glenn E, Instructional Assistant Professor
Mathematics
PHD, Texas Tech University, 2012

Landsberg, Joseph M, Professor
Mathematics
PHD, Duke University, 1990

Larson, David R, Professor
Mathematics
PHD, University of California, Berkeley, 1976

Lazarov, Raytcho D, Professor
Mathematics
PHD, University of Moscow, Russia, 1972

Lee, Sang Rae, Lecturer
Mathematics
PHD, University of Oklahoma, 2012

Lewis, Jennifer L, Senior Lecturer
Mathematics
PHD, The Ohio State University, 1980

Liao, Benben, Visiting Assistant Professor
Mathematics
PHD, Institut de Mathematiques de Jussieu, 2014

Limafilho, Paulo C, Professor
Mathematics
PHD, State University of New York at Stony Brook, 1989

Lynch, Benjamin R, Lecturer
Mathematics
PHD, University of Tennessee, 2010
Lynch, Richard G, Visiting Assistant Professor
Mathematics
PHD, University of Missouri - Columbia, 2016

Manuel, David J, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1994

Masri, Mohamad R, Associate Professor
Mathematics
PHD, The University of Texas at Austin, 2005

Matusevich, Laura F, Professor
Mathematics
PHD, University of California, Berkeley, 2002

Mogilevsky, Mila, Instructional Associate Professor
Mathematics
PHD, Rostov State University USSR, 1976

Motakis, Pavlos, Visiting Assistant Professor
Mathematics
PHD, National Technical University of Athens, 2015

Narayanasym, Francis J, Professor
Mathematics
PHD, Princeton University, 1972

Nekrashevych, Volodymyr, Professor
Mathematics
PHD, Taras Shevchenko National University, Russia, 1998

Onica, Constantin, Instructional Assistant Professor
Mathematics
PHD, Texas A&M University, 2005

Orchard, Patrick J, Lecturer
Mathematics
MS, Texas A&M University, 2015

Paouris, Grigorios, Professor
Mathematics
PHD, University of Crete, 2004

Papanikolas, Matthew A, Professor
Mathematics
PHD, Brown University, 1998

Pasciak, Joseph E, Professor
Mathematics
PHD, Cornell University, 1977

Pearlstein, Gregory J, Associate Professor
Mathematics
PHD, University of Massachusetts Amherst, 1999

Pearlstein, Rosanna, Lecturer
Mathematics
PHD, University of Massachusetts Amherst, 1998

Petrova, Guergana P, Professor
Mathematics
PHD, University of Southern Carolina, 1999

Pitts, Jon T, Professor
Mathematics
PHD, Princeton University, 1974

Plavnik, Julia Y, Visiting Assistant Professor
Mathematics
PHD, Universidad Nacional de Cordoba, Argentina, 2013

Poltoratski, Alexei G, Professor
Mathematics
PHD, California Institute of Technology, 1995

Popov, Bojan D, Professor
Mathematics
PHD, University of Southern Carolina, 1999

Procaccia, Eviatar B, Assistant Professor
Mathematics
PHD, Weizmann Institute of Science, 2013

Rahm, Robert, Visiting Assistant Professor
Mathematics
PHD, Washington University in St. Louis, 2017

Ramsey, Heather L, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 2004

Reihani, Kamran, Instructional Assistant Professor
Mathematics
PHD, Tarbiat Modares University, 2005

Rojas, Joseph M, Professor
Mathematics
PHD, University of California, Berkeley, 1995

Roque-Sol, Marco A, Lecturer
Mathematics
PHD, Texas A&M University, 2006

Rowell, Eric C, Professor
Mathematics
PHD, University of California, San Diego, 2003

Rundell, William, Professor
Mathematics
PHD, University of Glasgow, 1974

Schielack, Vincent, Associate Professor
Mathematics
PHD, The University of Texas at Austin, 1982

Schlumprecht, Thomas B, Professor
Mathematics
PHD, Ludwig Maximilians Universitat, Germany, 1988

Schrader, Todd W, Lecturer
Mathematics
MS, Texas A&M University, 2016

Sengupta, Sinjini, Senior Lecturer
Mathematics
PHD, Florida State University, 2006
Majors

- Bachelor of Arts in Mathematics (p. 627)
- Bachelor of Arts in Mathematics and Master of Science in Mathematics, 5-Year Degree Program (p. 629)
• Bachelor of Science in Mathematics (p. 630)
• Bachelor of Science in Mathematics and Master of Science in Mathematics, 5-Year Degree Program (p. 632)
• Bachelor of Science in Applied Mathematical Sciences, Actuarial Emphasis (p. 617)
• Bachelor of Science in Applied Mathematical Sciences, Biological Science Emphasis (p. 618)
• Bachelor of Science in Applied Mathematical Sciences, Computational Emphasis (p. 619)
• Bachelor of Science in Applied Mathematical Sciences, Economics Emphasis (p. 621)
• Bachelor of Science in Applied Mathematical Sciences, Math Emphasis (p. 622)
• Bachelor of Science in Applied Mathematical Sciences, Statistics Emphasis (p. 624)
• Bachelor of Science in Applied Mathematical Sciences and Master of Science in Mathematics, 5-Year Degree Program (p. 625)

Minors

• Mathematics Minor (p. 634)

Applied Mathematical Sciences - BS, Actuarial Emphasis

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science and Scientific Computing. The Actuarial Science emphasis includes mathematical finance.

A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to technological industries and/ or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate schools. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
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<td>MATH 171 Analytic Geometry and Calculus</td>
<td>4</td>
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<td>Select one of the following:</td>
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<tr>
<td>CSCE 110 Programming I</td>
<td></td>
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<tr>
<td>CSCE 111 Introduction to Computer Science Concepts and Programming</td>
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</tr>
<tr>
<td>CSCE 121 Introduction to Program Design and Concepts</td>
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<tr>
<td>CSCE 206 Structured Programming in C</td>
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</tr>
<tr>
<td>Select one of the following:</td>
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<td>BIOL 111 Introductory Biology I</td>
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Spring

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<tr>
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Second Year

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<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ECON 202 or ECON 203 Principles of Economics or Principles of Economics</td>
<td>3</td>
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<tr>
<td>HIST 106 History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220 Foundations of Mathematics</td>
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<tr>
<td>MATH 221 Several Variable Calculus</td>
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<td>STAT 211 Principles of Statistics I</td>
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Third Year

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<tr>
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<tr>
<td>MATH 325 The Mathematics of Interest</td>
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<tr>
<td>MATH 411 or STAT 414 Mathematical Probability or Mathematical Statistics I</td>
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<tr>
<td>MATH 425 The Mathematics of Contingent Claims</td>
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elective hours

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<th>Semester Credit Hours</th>
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<td>16</td>
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</table>

Texas A&M University Undergraduate Catalog 617
Applied Mathematical Sciences - BS, Biological Science Emphasis

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science and Scientific Computing. The Actuarial Science emphasis includes mathematical finance.

A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to technological industries and/or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate schools. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

Program Requirements

Biological Science Emphasis: Consult with departmental advisor.

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
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<td>MATH 171</td>
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<td>Select one of the following:</td>
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<td>CSCE 110</td>
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<tr>
<td>CSCE 111</td>
<td>4</td>
</tr>
<tr>
<td>CSCE 121</td>
<td>4</td>
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<tr>
<td>CSCE 206</td>
<td>4</td>
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<td>BIOL 111</td>
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<tr>
<td>Directed Studies</td>
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| Total Semester Credit Hours | 120 |

Spring

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<tr>
<td>HIST 105</td>
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<tr>
<td>MATH 172</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>4</td>
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</table>

| Total Semester Credit Hours | 16 |

1 MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.

2 Select 3 hours from any 200-400 level course.

3 MATH 411 should be taken the semester after taking MATH 221.

4 Three elective hours must be chosen from the approved University Core Curriculum (p. 21) list for creative arts. In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.

Remaining electives may be selected from any 100-499 course not used elsewhere, (except ALED 125, ASTR 109/PHYS 109, ASTR 119/PHYS 119, BMEN 101, BUSN 100, ISEN 101, KINE 199, LAND 101, MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376, PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201, PHYS 202, PHYS 205, PSY 301, STAT 201, STAT 301-303 (p. 970); STLC 102; URPN 200; WESC 101).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.
CHEM 101 & CHEM 111  
Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I

CHEM 107 & CHEM 117  
General Chemistry for Engineering Students and General Chemistry for Engineering Students Laboratory

Directed Studies 3 1

Second Year

Fall

MATH 220  
Foundations of Mathematics 3

MATH 221  
Several Variable Calculus 4

BIOL 213  
Molecular Cell Biology 3

STAT 211  
Principles of Statistics I 3

HIST 106  
History of the United States 3

Directed Studies 3 1

Semester Credit Hours 16

Spring

MATH 308  
Differential Equations 3

MATH 323  
Linear Algebra 3

BIOL 214  
Genes, Ecology and Evolution 3

CHEM 222 & CHEM 242  
Elements of Organic and Biological Chemistry and Elementary Organic Chemistry Laboratory 4

Directed Studies 3 1

Semester Credit Hours 17

Third Year

Fall

MATH 409  
Advanced Calculus I 3

MATH 469  
Introduction to Mathematical Biology 3

POLS 206  
American National Government 3

Directed Studies 3 1

MATH elective 2 3

Language, philosophy and culture (p. 23) 1 3

Semester Credit Hours 16

Spring

MATH 417 or MATH 437  
Numerical Methods or Principles of Numerical Analysis 4

MATH 442  
Mathematical Modeling 3

STAT 212  
Principles of Statistics II 3

Directed Studies 3 1

MATH elective 2 3

Semester Credit Hours 14

Fourth Year

Fall

MATH 410 or MATH 446  
Advanced Calculus II or Principles of Analysis I 3

MATH 415 or MATH 433  
Modern Algebra I or Applied Algebra 3

POLS 207  
State and Local Government 3

Select one of the following: 3

COMM 203  
Public Speaking

1 Select 3 hours from any 200-400 level course.
2 Select from MATH 325, MATH 407-499 (p. 885). One course must be a W or C course.
3 Select from MATH 285 or BIOL 285 (Quantative Biology Seminar.) Consult Departmental advisor for selection of proper section.
4 Three elective hours must be chosen from the approved University Core Curriculum (p. 21) list for creative arts. In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.

Remaining electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376, PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201, PHYS 203, PHYS 205; PSYC 301; STAT 201 STAT 301 - 303 (p. 970); STLC 102; URPN 200; WFSC 101).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

Applied Mathematical Sciences - BS, Computational Emphasis

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science

A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to technological industries and/or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate schools. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

## Program Requirements

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td></td>
<td>CSCE 110</td>
<td>Programming I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSCE 111</td>
<td>Introduction to Computer Science Concepts and Programming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSCE 206</td>
<td>Structured Programming in C</td>
<td></td>
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</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
<td></td>
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<td>ASTR 111</td>
<td>Overview of Modern Astronomy</td>
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Elective hours: 1

Semester Credit Hours: 16

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<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Spring</td>
<td>HIST 105</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 172</td>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CSCE 121</td>
<td>Introduction to Program Design and Concepts</td>
<td>4</td>
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</tbody>
</table>

Select one of the following:

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
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</tr>
<tr>
<td></td>
<td>ASTR 111</td>
<td>Overview of Modern Astronomy</td>
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Elective hours: 1

Semester Credit Hours: 16

### Second Year

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<tr>
<th>Semester</th>
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<tr>
<td>Fall</td>
<td>ECON 202 or ECON 203</td>
<td>Principles of Economics or Principles of Economics</td>
<td>3</td>
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<tr>
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<td>HIST 106</td>
<td>History of the United States</td>
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Semester Credit Hours: 16

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<td>MATH 308</td>
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<td>Language, philosophy and culture (p. 23)</td>
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Semester Credit Hours: 16

### Third Year

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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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<td>MATH 415 or MATH 433</td>
<td>Modern Algebra I or Applied Algebra</td>
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Semester Credit Hours: 16

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<td></td>
<td>MATH 417</td>
<td>Numerical Methods</td>
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<td>MATH 437</td>
<td>Principles of Numerical Analysis</td>
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<td></td>
<td>CSCE 442</td>
<td>Scientific Programming</td>
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<td></td>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<td></td>
<td>or OCNG 451</td>
<td>or Mathematical Modeling of Ocean Climate</td>
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<td></td>
<td>CSCE 221</td>
<td>Data Structures and Algorithms</td>
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Semester Credit Hours: 16

### Fourth Year

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<td>Public Speaking</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<td></td>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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<td>CSCE 314</td>
<td>Programming Languages</td>
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<td>CSCE 411</td>
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Semester Credit Hours: 12

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<th>Course Title</th>
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<td>MATH 325</td>
<td>The Mathematics of Interest</td>
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<td></td>
<td>MATH 407 - MATH 499 (p. 885)</td>
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<td>Select one of the following:</td>
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<tr>
<td></td>
<td>MATH 325</td>
<td>The Mathematics of Interest</td>
<td></td>
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<tr>
<td></td>
<td>MATH 407 - MATH 499 (p. 885)</td>
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<td></td>
<td>CSCE 210 - CSCE 470 (p. 768)</td>
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### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td><strong>ENGL 104</strong></td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td><strong>MATH 171</strong></td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
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<td><strong>Select one of the following:</strong></td>
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<td><strong>CSCE 110</strong></td>
<td>Programming I</td>
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<tr>
<td><strong>CSCE 111</strong></td>
<td>Introduction to Computer Science Concepts and Programming</td>
<td></td>
</tr>
<tr>
<td><strong>CSCE 121</strong></td>
<td>Introduction to Program Design and Concepts</td>
<td></td>
</tr>
<tr>
<td><strong>CSCE 206</strong></td>
<td>Structured Programming in C</td>
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</tr>
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<td><strong>Select one of the following:</strong></td>
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<td><strong>BIOL 111</strong></td>
<td>Introductory Biology I</td>
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<tr>
<td><strong>BIOL 112</strong></td>
<td>Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td><strong>CHEM 101</strong></td>
<td>Fundamentals of Chemistry I</td>
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<tr>
<td>&amp; <strong>CHEM 111</strong></td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td><strong>CHEM 102</strong></td>
<td>Fundamentals of Chemistry II</td>
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<tr>
<td>&amp; <strong>CHEM 112</strong></td>
<td>and Fundamentals of Chemistry Laboratory II</td>
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<td><strong>ASTR 111</strong></td>
<td>Overview of Modern Astronomy</td>
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#### Second Year

<table>
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<tr>
<th>Semester</th>
<th>Fall</th>
<th>Spring</th>
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<tr>
<td><strong>ENGL 104</strong></td>
<td>Composition and Rhetoric</td>
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<td><strong>MATH 171</strong></td>
<td>Analytic Geometry and Calculus</td>
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<td><strong>CSCE 110</strong></td>
<td>Programming I</td>
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<td>Structured Programming in C</td>
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<td></td>
</tr>
<tr>
<td><strong>BIOL 112</strong></td>
<td>Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td><strong>CHEM 101</strong></td>
<td>Fundamentals of Chemistry I</td>
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<tr>
<td>&amp; <strong>CHEM 111</strong></td>
<td>and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td><strong>CHEM 102</strong></td>
<td>Fundamentals of Chemistry II</td>
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<tr>
<td>&amp; <strong>CHEM 112</strong></td>
<td>and Fundamentals of Chemistry Laboratory II</td>
<td></td>
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<tr>
<td><strong>ASTR 111</strong></td>
<td>Overview of Modern Astronomy</td>
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</table>

### Applied Mathematical Sciences - BS, Economics Emphasis

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science and Scientific Computing. The Actuarial Science emphasis includes mathematical finance.

A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to technological industries and/or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate schools. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.
MATH 221  Several Variable Calculus  4
STAT 211  Principles of Statistics I  3

Semester Credit Hours  16

Spring
MATH 308  Differential Equations  3
MATH 323  Linear Algebra  3
POLS 206  American National Government  3
STAT 212  Principles of Statistics II  3
Language, philosophy and culture (p. 23)  3

Semester Credit Hours  15

Third Year
Fall
MATH 409  Advanced Calculus I  3
POLS 207  State and Local Government  3
PHYS 218  Mechanics  4
MATH 325  The Mathematics of Interest  3
Elective hours  3

Semester Credit Hours  16

Spring
MATH 411  Mathematical Probability or Mathematical Statistics I  3
or STAT 414
PHYS 208  Electricity and Optics or Mathematical Modeling of Ocean Climate  4
or OCNG 451
MATH 425  The Mathematics of Contingent Claims  3
Elective hours  3

Semester Credit Hours  14

Fourth Year
Fall
Select one of the following:  3
COMM 203  Public Speaking
COMM 205  Communication for Technical Professions
COMM 243  Argumentation and Debate
ECON 323  Microeconomic Theory  3
ECON 459  Games and Economic Behavior  3
ECMT 463  Introduction to Econometrics  3
ISEN 320  Operations Research I or Operations Research II  3
or ISEN 340
Elective hours  3

Semester Credit Hours  18

Spring
MATH 407-MATH 499 (p. 885)  6
Elective hours  3

Semester Credit Hours  9

Total Semester Credit Hours  120

1  MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.
2  Select 3 hours from any 200-400 level course.

3  Three elective hours must be chosen from the approved University Core Curriculum (p. 21) list for creative arts. In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.

Remaining electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 109,PHYS 119/ASTR 119, PHYS 201, PHYS 202, PHYS 205; PSYC 301; STAT 201, STAT 301 - 303 (p. 970); STLC 102; URPN 200; WFSC 101).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

Applied Mathematical Sciences - BS, Math Emphasis

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science and Scientific Computing. The Actuarial Science emphasis includes mathematical finance.

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Program Requirements

First Year

Fall

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<tr>
<th>Course</th>
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<tr>
<td>ENGL 104</td>
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<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
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<td>CSCE 110</td>
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<td>Introduction to Computer Science Concepts and Programming</td>
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<td>CHEM 102 &amp; CHEM 112</td>
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**Semester Credit Hours** 16

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<td>MATH 172</td>
<td>Calculus</td>
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**Semester Credit Hours** 16

**Second Year**

**Fall**

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<td>Principles of Economics or Principles of Economics</td>
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<tr>
<td>HIST 106</td>
<td>History of the United States</td>
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<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
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<td>MATH 221</td>
<td>Several Variable Calculus</td>
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<td>STAT 211</td>
<td>Principles of Statistics I</td>
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**Semester Credit Hours** 16

**Spring**

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<td>MATH 308</td>
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<td>Linear Algebra</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>STAT 212</td>
<td>Principles of Statistics II</td>
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**Semester Credit Hours** 16

**Third Year**

**Fall**

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<td>MATH 409</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
</tr>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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<td>MATH 410 or MATH 446</td>
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**Semester Credit Hours** 15

**Spring**

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<th>Course Title</th>
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<tr>
<td>MATH 417 or MATH 437</td>
<td>Numerical Methods or Principles of Numerical Analysis</td>
</tr>
<tr>
<td>PHYS 208 or OCNG 451</td>
<td>Electricity and Optics or Mathematical Modeling of Ocean Climate</td>
</tr>
<tr>
<td>MATH 415 or MATH 433</td>
<td>Modern Algebra I or Applied Algebra</td>
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<td>Elective hours</td>
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**Semester Credit Hours** 16

**Fourth Year**

**Fall**

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<td>COMM 203</td>
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<td>COMM 205</td>
<td>Communication for Technical Professions</td>
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<tr>
<td>COMM 243</td>
<td>Argumentation and Debate</td>
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Select one of the following: 3

<table>
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<th>Course Code</th>
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<td>MATH 412</td>
<td>Theory of Partial Differential Equations</td>
</tr>
<tr>
<td>MATH 414</td>
<td>Fourier Series and Wavelets</td>
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<tr>
<td>MATH 442</td>
<td>Mathematical Modeling</td>
</tr>
<tr>
<td>MATH 470</td>
<td>Communications and Cryptography</td>
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<td>MATH 471</td>
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Select up to six hours from the following: 6

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<td>MATH 407-MATH 499</td>
<td>(p. 885)</td>
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<td>STAT 407-STAT 415</td>
<td>(p. 970)</td>
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<td>(p. 768)</td>
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<tr>
<td>ISEN 320</td>
<td>Operations Research I</td>
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<td>ISEN 340</td>
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**Semester Credit Hours** 12

**Spring**

Select nine hours from the following: 9

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<tr>
<td>MATH 407-MATH 499</td>
<td>(p. 885)</td>
</tr>
</tbody>
</table>

**Elective hours** 5

**Semester Credit Hours** 14

**Total Semester Credit Hours** 120

---

1 MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.

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Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

### Applied Mathematical Sciences - BS, Statistics Emphasis

Many advances in technology and business are achieved by people applying technical knowledge from statistics, computing science, finance, economics and mathematics. The curriculum in applied mathematical sciences provides study in all of these areas, with ample electives available to allow further in-depth study of any of these areas. In fact, there are six emphases in this curriculum: Applied Mathematics, Statistics, Actuarial Science, Economics, Biological Science and Scientific Computing. The Actuarial Science emphasis includes mathematical finance.

A student completing this program is prepared to enter employment with analytical and quantitative tools relevant to technological industries and/ or modern financial markets. On the other hand, with the appropriate electives chosen, the student is prepared to enter quantitatively oriented graduate schools. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Course Code</th>
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<tr>
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<td>STAT 211</td>
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<td>Foundations of Mathematics</td>
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<td>Third Year</td>
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<tr>
<td>Fall</td>
<td>MATH 409</td>
<td>Advanced Calculus I</td>
</tr>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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<td>Select one of the following:</td>
<td>MATH 411</td>
<td>Mathematical Probability</td>
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<td>STAT 407</td>
<td>Principles of Sample Surveys</td>
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<td>STAT 408</td>
<td>Introduction to Linear Models</td>
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<td>STAT 414</td>
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<td>Spring</td>
<td>MATH 417</td>
<td>Numerical Methods</td>
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<td>or MATH 437</td>
<td>Principles of Numerical Analysis</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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<td>or OCNG 451</td>
<td>or Mathematical Modeling of Ocean Climate</td>
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<td>ISEN 320</td>
<td>Operations Research I</td>
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<td>COMM 243</td>
<td>Argumentation and Debate</td>
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<td>Select six to twelve hours from the following:</td>
<td>MATH 325</td>
<td>The Mathematics of Interest</td>
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<td>MATH 407-MATH 499 (p. 885)</td>
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<td>STAT 485</td>
<td>Directed Studies</td>
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<td>STAT 489</td>
<td>Special Topics in...</td>
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<td>ISEN 320 - ISEN 499 (p. 853)</td>
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<td>STAT 400 - STAT 499 (p. 970)</td>
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<td>Elective hours</td>
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<td>Semester Credit Hours</td>
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<td>Total Semester Credit Hours</td>
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</table>

3 Three elective hours must be chosen from the approved University Core Curriculum (p. 21) list for creative arts. In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.

Remaining electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201, PHYS 202, PHYS 205, PSYC 301; STAT 201, STAT 301 - 303 (p. 970); STLC 102; URPN 200; WFSC 101).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

Applied Mathematics - 5-Year Bachelor of Science/Master of Science in Mathematics

The FastTrack Degree Program enables ambitious and academically talented mathematics majors at Texas A&M University to earn both a bachelor's degree and a master's degree within a period of five years after entering Texas A&M.

Amongst the various advantages of the program, upon its completion a student will be in an exceptionally strong position to enter:

- The professional industrial job marketplace;
- A career in secondary education;
- A doctoral program in mathematics, or in a related discipline, at Texas A&M or another university.

The related disciplines include computer science, engineering, physics, statistics, genetics, economics, business administration, education, and biology.

Eligibility for entering a doctoral program in one of these disciplines would depend in part on the undergraduate and graduate external options and areas of emphasis that were reflected in a student's individual degree plan.

1 MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.

2 Select 3 hours from any 200-400 level course.
# Program Requirements

## First Year

### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<td>ENGL 104</td>
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<td>MATH 171</td>
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<tr>
<td></td>
<td>CSCE 110 Programming I</td>
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<td></td>
<td>CSCE 111 Introduction to Computer Science Concepts and Programming</td>
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<td></td>
<td>CSCE 121 Introduction to Program Design and Concepts</td>
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<td>CSCE 206 Structured Programming in C</td>
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### Spring

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<th>Course</th>
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<tr>
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<td>(p. 25)</td>
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<td>MATH 172</td>
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<td>CSCE 121 Introduction to Program Design and Concepts</td>
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<td>CSCE 206 Structured Programming in C</td>
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## Second Year

### Fall

<table>
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<tr>
<td>American history</td>
<td>(p. 25)</td>
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<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
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## Third Year

### Fall

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<td>3</td>
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<td>Government/Political science</td>
<td>(p. 25)</td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
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<td>MATH 410</td>
<td>Advanced Calculus II</td>
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<td>or MATH 437</td>
<td>or Principles of Numerical Analysis</td>
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<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
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<tr>
<td>or OCNG 451</td>
<td>or Mathematical Modeling of Ocean Climate</td>
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<tr>
<td>MATH 415</td>
<td>Modern Algebra I</td>
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<td>or MATH 433</td>
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## Fourth Year

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<td>COMM 205 Communication for Technical Professions</td>
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<td>COMM 243 Argumentation and Debate</td>
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<td>MATH 414 Fourier Series and Wavelets</td>
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<td>MATH 442 Mathematical Modeling</td>
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<td>MATH 325 The Mathematics of Interest</td>
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<td>MATH 407-MATH 499 (p. 970)</td>
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<td>STAT 407-STAT 415 (p. 970)</td>
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<td>CSCE 210-CSCE 470 (p. 768)</td>
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<td>ISEN 320 or ISEN 340 (p. 853)</td>
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<tr>
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MATH 603-MATH 628 (p. 853)
MATH 630-MATH 639 (p. 853)
MATH 641-MATH 644 (p. 853)
MATH 647-MATH 684 (p. 853)

Elective hours 2

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Fifth Year
Fall

Graduate Degree 5

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1 Select 3 hours from any 200-400 level course.

2 Three elective hours must be chosen from the approved University Core Curriculum (p. 21) list for creative arts. In addition, 6 hours of courses must be in the area of International and Cultural Diversity (p. 40). These may be in addition to University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.

Remaining electives may be selected from any 100-499 course not used elsewhere (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 119, PHYS 201, PHYS 202, PHYS 205; PSYC 301; STAT 201, STAT 301-303 (p. 970); STLC 102; URPN 200; WFSC 101).

3 MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.

4 This 6 hours will be applied towards both BS and MS degrees in Mathematics.

5 The overall program hours (156 hours) includes 36 hours for a non-thesis option or 32 hours for a thesis option (up to six of which are MATH 691). Up to six hours of graduate courses may double count. MATH 601 is prohibited for all graduate degree plans. Except for the MS teaching track, no distance course may be used on the degree plan nor may MATH 696 appear. For the MS teaching track, students must take four distance courses: MATH 629, MATH 645, MATH 646 and MATH 696. All five tracks require at least 24 credit hours of mathematics of which at most six may be undergraduate. Depending on the MS track, courses outside of mathematics may be required or optional. For additional information, reference https://www.math.tamu.edu/graduate/masters and select the track of interest.

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151 / MATH 171, MATH 152 / MATH 172, MATH 221 / MATH 251 / MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

Mathematics - BA

The Bachelor of Arts degree in Mathematics is intended for students who are interested in a traditional liberal arts education in mathematics. A minor field of study must be chosen for this degree.

Program Requirements

First Year
Fall

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<td>Analytic Geometry and Calculus</td>
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<td>American History (p. 25)</td>
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<tr>
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<td>Government/Political science (p. 25)</td>
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<td>CHEM 102</td>
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<tr>
<td>ASTR 111</td>
<td>Overview of Modern Astronomy</td>
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<td>Elective hours 1</td>
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Spring

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<td>Government/Political science (p. 25)</td>
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<td>Overview of Modern Astronomy</td>
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### Second Year

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<td>STAT 211 Principles of Statistics I</td>
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<td>Select one of the following:</td>
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<tr>
<td>American History (p. 25)</td>
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<tr>
<td>Government/Political science (p. 25)</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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### Spring

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
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<tr>
<td>MATH 308 Differential Equations</td>
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<td>MATH 323 Linear Algebra</td>
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<td>COMM 205 Communication for Technical Professions</td>
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### Third Year

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<tr>
<td>MATH 409 Advanced Calculus I</td>
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### Spring

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<td>MATH 423 Linear Algebra II</td>
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<td>MATH 433 Applied Algebra</td>
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<td>MATH elective (p. 885)</td>
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<td>MATH elective (p. 885)</td>
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<td>Select one of the following:</td>
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<td>Creative Arts (p. 24)</td>
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<td>Social and behavioral sciences (p. 25)</td>
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### Spring

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<tr>
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<tr>
<td>Select one of the following:</td>
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1. MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.
2. Select 3 hours from any 200-400 level Language, philosophy and culture (p. 23) course.
3. A 15-18-hour minor field of study should be chosen in conference with a departmental advisor.
4. Six hours of courses must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.
5. Nine of the 12 hours of math elective courses are to be from any 400- or 600-level MATH, excluding MATH 401 and MATH 601. The last three hours can be from any 400- or 600-level MATH (excluding MATH 401 or MATH 601), any 400-level STAT (p. 970), CSCE 210 - 470 (p. 768), or ISEN 320-430, (p. 853) excluding any 485 course in any department without permission of a departmental advisor. Students wishing to be certified must take MATH 403 and MATH 467. Students who plan to attend graduate school are encouraged to take MATH 416, MATH 447 and at least one 600-level course.
6. Three hours must be social and behavioral sciences (p. 25) and three hours must be creative arts (p. 24).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437, or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253/MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two Ds in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.
Mathematics - 5-Year Bachelor of Arts/Master of Science in Mathematics

The FastTrack Degree Program enables ambitious and academically talented mathematics majors at Texas A&M University to earn both a bachelor’s degree and a master’s degree within a period of five years after entering A&M.

Amongst the various advantages of the program, upon its completion a student will be in an exceptionally strong position to enter:

- The professional industrial job marketplace;
- A career in secondary education;
- A doctoral program in mathematics, or in a related discipline, at Texas A&M or another university.

The related disciplines include computer science, engineering, physics, statistics, genetics, economics, business administration, education, and biology.

Eligibility for entering a doctoral program in one of these disciplines would depend in part on the undergraduate and graduate external options and areas of emphasis that were reflected in a student’s individual degree plan.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
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<td>Elective hours 6</td>
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<td>MATH 171 Analytic Geometry and Calculus</td>
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<tr>
<td>Select one of the following: American history (p. 25)</td>
<td>3</td>
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<tr>
<td>Government/Political science (p. 25)</td>
<td>3</td>
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<tr>
<td>Select one from: BIOL 111 Introductory Biology I</td>
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<tr>
<td>BIOL 112 Introductory Biology II</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111 Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>CHEM 102 &amp; CHEM 112 Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td>ASTR 111 Overview of Modern Astronomy</td>
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<tbody>
<tr>
<td>MATH 172 Calculus</td>
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<td>Government/Political science (p. 25)</td>
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Second Year

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<tr>
<td>MATH 220 Foundations of Mathematics</td>
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<tr>
<td>MATH 221 Several Variable Calculus</td>
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</tr>
<tr>
<td>STAT 211 Principles of Statistics I</td>
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<tr>
<td>Select one of the following: American history (p. 25)</td>
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<tbody>
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<td>MATH 308 Differential Equations</td>
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<tr>
<td>MATH 323 Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following: American history (p. 25)</td>
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<tr>
<td>Government/Political science (p. 25)</td>
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<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Third Year</th>
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<tbody>
<tr>
<td>MATH 409 Advanced Calculus I</td>
<td>3</td>
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<tr>
<td>PHYS 218 Mechanics</td>
<td>4</td>
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<tr>
<td>Elective hours 3</td>
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<td>Minor elective 2</td>
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<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Select one from: MATH 415 Modern Algebra I</td>
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<tr>
<td>MATH 423 Linear Algebra II</td>
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<td>MATH 433 Applied Algebra</td>
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<tr>
<td>Select one from: CSCE 210-CSCE 470 (p. 853)</td>
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<td>ISEN 320-ISEN 430 (p. 853)</td>
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### Fifth Year

#### Fall

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<tr>
<td>MATH 403-MATH 499 (p. 853)</td>
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<tr>
<td>STAT 407-STAT 415 (p. 853)</td>
<td>Select one from:</td>
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<td># Minor elective 2</td>
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<tr>
<td>Elective hours 3</td>
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</table>

#### Sixth Year

- Six hours of courses must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.
- Remaining electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376, PHYS 109/ASTR 109, PHYS 119/ASTR 119; PHYS 201, PHYS 202, PHYS 205; PSYC 301; STAT 201, STAT 301 - 303 (p. 970); STLC 102; URPN 200; WFS 101).
- This 6 hours will be applied towards both BA and MS degrees in Mathematics.
- Three hours must be social and behavioral sciences (p. 25) and three hours must be creative arts (p. 24).
- MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.
- The overall program hours (156 hours) includes 36 hours for a non-thesis option or 32 hours for a thesis option (up to six of which are MATH 691). Up to six hours of graduate courses may double count. MATH 601 is prohibited for all graduate degree plans. except for the MS teaching track, no distance class may be used on the degree plan nor may MATH 601 appear. For the MS teaching track, students must take four distance courses: MATH 629, MATH 645, MATH 646 and MATH 696. All five tracks require at least 24 credit hours of mathematics of which at most six may be undergraduate. Depending on the MS track, courses outside of mathematics may be required or optional. For additional information, reference https://www.math.tamu.edu/graduate/masters and select the track of interest.

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two Ds in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

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### Program Requirements

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<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104 Composition and Rhetoric 3</td>
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</table>

1 Select three hours from any 200-400 level Language, philosophy and culture (p. 23) course.
2 A 15-18-hour minor field of study should be chosen in conference with a departmental advisor.
MATH 171 Analytic Geometry and Calculus 4
Select one of the following: 3
American history (p. 25)
Government/Political science (p. 25)
Select one of the following: 4
BIOL 111 Introductory Biology I
BIOL 112 Introductory Biology II
CHEM 101 Fundamentals of Chemistry I
& CHEM 111 and Fundamentals of Chemistry Laboratory I
CHEM 102 Fundamentals of Chemistry II
& CHEM 112 and Fundamentals of Chemistry Laboratory II
ASTR 111 Overview of Modern Astronomy
Elective hours 1
Semester Credit Hours 15
Spring
MATH 172 Calculus 4
Select one of the following: 3
American history (p. 25)
Government/Political science (p. 25)
Select one of the following: 4
CSCE 110 Programming I
CSCE 111 Introduction to Computer Science Concepts and Programming
CSCE 121 Introduction to Program Design and Concepts
CSCE 206 Structured Programming in C
Select one of the following: 4
BIOL 111 Introductory Biology I
BIOL 112 Introductory Biology II
CHEM 101 Fundamentals of Chemistry I
& CHEM 111 and Fundamentals of Chemistry Laboratory I
CHEM 102 Fundamentals of Chemistry II
& CHEM 112 and Fundamentals of Chemistry Laboratory II
ASTR 111 Overview of Modern Astronomy
Elective hours 1
Semester Credit Hours 16
Second Year
Fall
MATH 220 Foundations of Mathematics 3
MATH 221 Several Variable Calculus 4
Select one of the following: 3
American history (p. 25)
Government/Political science (p. 25)
Science elective 2
Semester Credit Hours 14
Spring
MATH 308 Differential Equations 3
MATH 323 Linear Algebra 3
PHYS 218 Mechanics 4
Select one of the following: 3
American history (p. 25)
Government/Political science (p. 25)
Language, philosophy and culture (p. 23) 3
Semester Credit Hours 16
Third Year
Fall
MATH 409 Advanced Calculus I 3
MATH 415 Modern Algebra I 3
Elective hours 3
Science elective 2
Select one of the following:
COMM 203 Public Speaking
COMM 205 Communication for Technical Professions
COMM 243 Argumentation and Debate
Semester Credit Hours 13
Spring
MATH 410 or MATH 446 Advanced Calculus II or Principles of Analysis I 3
MATH 416 Modern Algebra II 3
PHYS 208 or OCNG 451 Electricity and Optics or Mathematical Modeling of Ocean Climate 4
CORE elective 4
Semester Credit Hours 16
Fourth Year
Fall
MATH 411 or STAT 414 Mathematical Probability or Mathematical Statistics I 3
CORE elective 4
Select one of the following: 3
Science elective 2
Semester Credit Hours 15
Spring
MATH elective (p. 885) 5
CORE elective 4
Select one of the following: 3
Semester Credit Hours 15
Total Semester Credit Hours 120

1 MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.
2 Six (6) hours must be selected from BICH 401-489 (p. 739); BIOL 200-470 (p. 741); CHEM 222-474 (p. 752); GENE 301-452 (p. 821); OCNG 251-252, 401-420 (p. 923); PHYS 221, 302-305, 307-314, 324-428 (p. 933). Four (4) hours must be selected from ASTR 111; BICH 401-489 (p. 739); BIOL 111, BIOL 112, BIOL 200-470, 318-438 (p. 741); CHEM 101, CHEM 102, CHEM 111, CHEM 112, CHEM 222-474 (p. 752); GENE 301-452 (p. 821); OCNG 251, OCNG 252, OCNG 401-420 (p. 923); PHYS 221, 302-305, 307-314, 324-428 (p. 933).
3 Select 3 hours from any 200- to 400-level Language, philosophy and culture (p. 23) course.
Mathematics - 5-Year Bachelor of Science/Master of Science in Mathematics

The FastTrack Degree Program enables ambitious and academically talented mathematics majors at Texas A&M University to earn both a bachelor’s degree and a master’s degree within a period of five years after entering A&M.

Program Requirements

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<tr>
<th>Semester Credit Hours</th>
<th>Course</th>
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<tr>
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<td>ENGL 104 Composition and Rhetoric</td>
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<td>MATH 171 Analytic Geometry and Calculus</td>
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<td>Select one of the following:</td>
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<td>Government/Political science (p. 25)</td>
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<td>CHEM 102 Fundamentals of Chemistry II &amp; CHEM 112 and Fundamentals of Chemistry Laboratory II</td>
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Spring

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<td>Government/Political science (p. 25)</td>
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<td>Select one from:</td>
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<td>CSCE 206 Structured Programming in C</td>
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<td>16</td>
<td>Select one from:</td>
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<td>BIOL 111 Introductory Biology I</td>
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<td>BIOL 112 Introductory Biology II</td>
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<td>CHEM 101 Fundamentals of Chemistry I &amp; CHEM 111 and Fundamentals of Chemistry Laboratory I</td>
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<td>ASTR 111 Overview of Modern Astronomy</td>
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Second Year

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<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>3</td>
<td>MATH 220 Foundations of Mathematics</td>
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</table>
MATH 221  Several Variable Calculus  4
Select one from the following:  3
American history (p. 25)
Government/Political science (p. 25)
Science elective  4

Semester Credit Hours  14

Spring
MATH 308  Differential Equations  3
MATH 323  Linear Algebra  3
PHYS 218  Mechanics  4
Select one of the following:  3
Language, philosophy and culture (p. 23)  3
American history (p. 25)
Government/Political science (p. 25)

Semester Credit Hours  16

Third Year
Fall
MATH 409  Advanced Calculus I  3
MATH 415  Modern Algebra I  3
Elective hours  6
Science elective  3
Select one from:
COMM 203  Public Speaking
COMM 205  Communication for Technical Professions
COMM 243  Argumentation and Debate

Semester Credit Hours  15

Spring
MATH 410  Advanced Calculus II  3
or MATH 446  or Principles of Analysis I
MATH 416  Modern Algebra II  3
PHYS 208  or OCNG 451  Electricity and Optics
or Mathematical Modeling of Ocean Climate
CORE elective  3

Semester Credit Hours  13

Fourth Year
Fall
MATH 411  Mathematical Probability  3
or STAT 414  or Mathematical Statistics I
CORE elective  3
Elective hours  6
Select one from:
MATH 427  Introduction to Number Theory
MATH 431  Structures and Methods of Combinatorics
MATH 436  Introduction to Topology
MATH 439  Differential Geometry of Curves and Surfaces
Science elective  3

Semester Credit Hours  16

Spring
Select one from:
MATH 325  The Mathematics of Interest
MATH 407-MATH 499 (p. 853)

Select from:  5
MATH 603-MATH 628 (p. 853)
MATH 630-MATH 639 (p. 853)
MATH 641-MATH 644 (p. 853)
MATH 647-MATH 684 (p. 853)

CORE elective  6

Semester Credit Hours  15

Total Semester Credit Hours  120

Fifth Year
Fall

Graduate Degree  7

Semester Credit Hours  36

Total Semester Credit Hours  36

1 Six (6) hours must be selected from BICH 401-489 (p. 739); BIOL 200-470 (p. 741); CHEM 222-474 (p. 752); GENE 301-452 (p. 821); OCNG 251-252, 401-420 (p. 923); PHYS 221, 302-305, 307-314, 324-428 (p. 933). Four (4) hours must be selected from ASTR 111; BICH 401-489 (p. 739); BIOL 111, 112, 200-470, 318-438 (p. 741); CHEM 101-102, 111-112, 222-474 (p. 752); GENE 301-452 (p. 821); OCNG 251-252, 401-420 (p. 923); PHYS 221, 302-305, 307-314, 324-428 (p. 933).

2 Three hours must be creative arts (p. 24) and three hours must be social and behavioral sciences (p. 25). In addition, six hours must be in the area of international and cultural diversity. These may be in addition to other University Core Curriculum (p. 21) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Students desiring teacher certification should consult the requirements for certification before registering for electives.

3 Select 3 hours from any 200- to 400-level Language, philosophy and culture (p. 23) course.

4 MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172.

5 This 6 hours will be used towards both the BS and MS degrees in Mathematics.

6 Remaining electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (http://catalog.tamu.edu/undergraduate/course-descriptions/math), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201, PHYS 202, PHYS 205; PSYC 301; STAT 201, STAT 301 · 303 (http://catalog.tamu.edu/undergraduate/course-descriptions/stat); STLC 102; URPN 200; WFSC 101).
Mathematics - Minor

Getting a Minor in Mathematics is Simple!

Students wishing to earn a minor in mathematics do not need to visit the Mathematics Department to do so. They should see their advisor, and inform them of their intention to earn a minor in mathematics, and to have that information entered into COMPASS.

The department also wants to point out to students who are majoring in engineering or one of the sciences that it might not take more than another 18 to 24 hours to get a double major in mathematics. If that is of interest to you, contact Mathematics Undergraduate Program Office.

Program Requirements

Non-math majors can obtain a minor in mathematics by meeting the following requirements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td></td>
</tr>
<tr>
<td>MATH 172</td>
<td>Calculus</td>
<td></td>
</tr>
<tr>
<td>Select one from:</td>
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<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>MATH 253</td>
<td>Engineering Mathematics II</td>
<td></td>
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<tr>
<td>Select from the following:</td>
<td>9</td>
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<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics I</td>
<td></td>
</tr>
<tr>
<td>300-400 level Mathematics course $^2$, $^3$</td>
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</table>

400 level Mathematics course $^2$, $^3$ 3

Total Semester Credit Hours 16

1. Only one of MATH 221, MATH 251, or MATH 253 can be taken to satisfy the minor, due to the course content.
2. Only one of MATH 304, MATH 309, MATH 311 or MATH 323 can be taken to satisfy the minor, due to the course content.
3. All 300-400 level MATH courses MUST be taken at Texas A&M University. No transfer work will be accepted.

Students must make a grade of "C" or better in all courses.

MATH 131, MATH 141, MATH 142, MATH 365, MATH 366, MATH 367, MATH 368, MATH 403, and MATH 485 may not be used to satisfy the requirements. MATH 485 will receive approval only under exceptional circumstances.

Department of Physics and Astronomy

Physics seeks to understand the fundamental workings of nature, from the constituents of matter deep within the nuclei of atoms, to the most distant galaxies of our expanding universe, to everyday phenomena of emergent complexity, self-organization and chaos. The resulting basic physical knowledge provides a firm foundation for innovations and is often the driving force of advanced technology. Computers, global positioning systems (GPS), the internet, lasers, magnetic resonance imaging (MRI) and other medical diagnostic tools, and space flight, along with many others, were all made possible by key advances in physics.

Physicists have a curiosity that thrives on the challenge of solving problems. Consistent with this, the physics program at Texas A&M strives to teach analytical thinking and quantitative problem-solving skills. This enables students to work productively in physics, in areas closely related to physics, and in a wide variety of areas outside of physics proper. Physicists can be found in almost any discipline that requires complex problem-solving skills. Some engage in cutting-edge research to increase our basic knowledge of the universe. Some apply new-found knowledge to make practical advances in the fields of computer science, medical science and engineering. Still others use their knowledge to advocate, advise, inform, instruct and administrate as lawyers, consultants, journalists/writers, teachers and managers.

The Department of Physics and Astronomy offers two undergraduate degree programs, a Bachelor of Arts and a Bachelor of Science, as well as minors in Astrophysics and Physics. The Department of Physics and Astronomy also offers Master of Science degrees in Astronomy and Physics, and Doctor of Philosophy degrees in Applied Physics, Astronomy and Physics.

The faculty members of the department carry out theoretical and experimental research in the areas of astronomy and astrophysics, atomic, molecular and optical physics, computational physics, cosmology, high-energy and elementary particle physics, condensed matter physics and materials science, nuclear physics and quantum optics. During the course of their undergraduate experience at Texas A&M, Physics majors have the opportunity to work with faculty in all of these areas.
Faculty

Abanov, Artem G, Associate Professor
Physics And Astronomy
PHD, Texas A&M University, 1998

Adair, Thomas W, Professor
Physics And Astronomy
PHD, Texas A&M University, 1965

Agnolet, Glenn, Professor
Physics And Astronomy
PHD, Cornell University, 1983

Akimov, Alexey, Assistant Professor
Physics And Astronomy
PHD, Moscow Institute of Technology, 2003

Allen, Roland E, Professor
Physics And Astronomy
PHD, The University of Texas at Austin, 1969

Aronson, Meigan C, Professor
Physics And Astronomy
PHD, University of Illinois at Urbana-Champaign, 1988

Bassichis, William H, Professor
Physics And Astronomy
PHD, Case Western Reserve University, 1963

Becker, Katrin, Professor
Physics And Astronomy
PHD, University of Bonn, Germany, 1994

Becker, Melanie, Professor
Physics And Astronomy
PHD, University of Bonn, Germany, 1994

Belyanin, Alexey A, Professor
Physics And Astronomy
PHD, Institute of Applied Physics, Russian Academy of Sciences, 1995

Chin, Siu A, Professor
Physics And Astronomy
PHD, Massachusetts Institute of Technology, 1975

Christian, Gregory A, Assistant Professor
Physics And Astronomy
PHD, Michigan State University, 2011

Depoy, Darren L, Professor
Physics And Astronomy
PHD, University of Hawaii at Manoa, 1987

Dierker, Steven B, Professor
Physics And Astronomy
PHD, University of Illinois at Urbana-Champaign, 1983

Dutta, Bhaskar, Professor
Physics And Astronomy
PHD, Oklahoma State University, 1995

Erokhimova, Tatiana L, Instructional Associate Professor
Physics And Astronomy
PHD, Institute of Applied Physics, Russian Academy of Sciences, 1999

Eusebi, Ricardo, Associate Professor
Physics And Astronomy
PHD, University of Rochester, 2006

Finkelstein, Alexander, Professor
Physics And Astronomy
PHD, Lavdu Institute for Theoretical Physics, 1972

Ford, Albert L, Professor
Physics And Astronomy
PHD, The University of Texas at Austin, 1972

Fries, Rainer J, Associate Professor
Physics And Astronomy
PHD, University of Regensburg, Germany, 2001

Fry, Edward S, Distinguished Professor
Physics And Astronomy
PHD, University of Michigan, 1969

Gagliardi, Carl A, Professor
Physics And Astronomy
PHD, Princeton University, 1982

Hardy, John C, Distinguished Professor
Physics And Astronomy
PHD, McGill University, 1965

Herschbach, Dudley R, Distinguished Professor
Physics And Astronomy
PHD, Harvard University, 1958

Holt, Jeremy W, Assistant Professor
Physics And Astronomy
PHD, Stony Brook University, 2016

Kamon, Teruki, Professor
Physics And Astronomy
PHD, University of Tsukuba, 1986

Ko, Che-Ming, Professor
Physics And Astronomy
PHD, University of California, Santa Cruz, 2001

Kocharovskaya, Olga A, Distinguished Professor
Physics And Astronomy
PHD, Institute of Applied Physics, Russian Academy of Sciences, 1986

Kocharovsky, Vitaly V, Professor
Physics And Astronomy
PHD, Institute of Applied Physics, Russian Academy of Sciences, 1998

Krischunas, Kevin L, Instructional Assistant Professor
Physics And Astronomy
PHD, University of Washington, 2000

Kwiatkowski, Anna A, Assistant Professor
Physics And Astronomy
PHD, Michigan State University, 2011
Lee, David M, Distinguished Professor
Physics And Astronomy
PHD, Yale University, 1959

Lyuksyutov, Igor F, Professor
Physics And Astronomy

Macri, Lucas M, Professor
Physics And Astronomy
PHD, Harvard University, 2001

Mahapatra, Rupak K, Professor
Physics And Astronomy
PHD, University of Minnesota, Twin Cities, 2000

Marshall, Jennifer L, Assistant Professor
Physics And Astronomy
PHD, The Ohio State University, 2006

McIntyre, Peter M, Professor
Physics And Astronomy
PHD, University of Chicago, 1973

Melconian, Daniel G, Associate Professor
Physics And Astronomy
PHD, Simon Fraser University, 2006

Mioduszewski, Saskia, Professor
Physics And Astronomy
PHD, University of Tennessee, 1999

Mirabolfathi, Nader, Research Associate Professor
Physics And Astronomy
PHD, University of Paris XI, 2002

Nanopoulos, Dimitri V, Distinguished Professor
Physics And Astronomy
PHD, University of Sussex, Falmer, Brighton, England, 1973

Naugle, Donald G, Professor
Physics And Astronomy
PHD, Texas A&M University, 1965

Papovich, Casey J, Professor
Physics And Astronomy
PHD, Johns Hopkins University, 2002

Pokrovsky, Valery, Distinguished Professor
Physics And Astronomy
PHD, Tomsk State University, 1957

Pope, Christopher N, Distinguished Professor
Physics And Astronomy
PHD, University of Cambridge, 1980

Rapp, Ralf F, Professor
Physics And Astronomy
PHD, Rheinische Friedrich-Wilhelma University, Bonn, 1996

Rogachev, Grigory V, Professor
Physics And Astronomy
PHD, National Research Centre, 1999

Ross, Joseph H, Professor
Physics And Astronomy
PHD, University of Illinois at Urbana-Champaign, 1986

Safronov, Alexei N, Professor
Physics And Astronomy
PHD, University of Florida, 2001

Saslow, Wayne M, Lecturer
Physics And Astronomy
PHD, University of California, Irvine, 1968

Schuessler, Hans A, Professor
Physics And Astronomy
PHD, Universitat Heidelberg, 1964

Scully, Marlan O, Distinguished Professor
Physics And Astronomy
PHD, Yale University, 1966

Sezgin, Ergin, Professor
Physics And Astronomy
PHD, State University of New York at Stony Brook, 1980

Sokolov, Alexei V, Professor
Physics And Astronomy
PHD, Stanford University, 2001

Strigari, Louis E, Assistant Professor
Physics And Astronomy
PHD, The Ohio State University, 2014

Suntzeff, Nicholas B, Professor
Physics And Astronomy
PHD, Stanford University, 2001

Teizer, Winfried, Professor
Physics And Astronomy
PHD, University of Massachusetts Amherst, 1998

Toback, David, Professor
Physics And Astronomy
PHD, University of Chicago, 1997

Tran, Kim-Vy H, Professor
Physics And Astronomy
PHD, University of California, Santa Cruz, 2002

Tribble, Robert E, Distinguished Professor
Physics And Astronomy
PHD, Princeton University, 1973

Ulmer, Keith A, Assistant Professor
Physics And Astronomy
PHD, University of Colorado, 2007

Wang, Dawei, Professor
Physics and Astronomy
PHD, Chinese University of Hong Kong, 2012
Majors

- Bachelor of Arts in Physics (p. 637)
- Bachelor of Science in Physics (p. 638)

Minors

- Astrophysics Minor (p. 639)
- Physics Minor (p. 639)

Physics - BA

The Bachelor of Arts curriculum provides the student with a firm foundation in physics and with the flexibility to choose from a large number of elective courses, thus permitting the student to explore other interests. Except for those students pursuing teacher certification, some of these elective courses are chosen to satisfy the requirements of a minor field of study. The student can, therefore, customize his or her program of study in preparation for a career in any science-related or science-required field, from intellectual property law and science reporting to physics teaching. Although not required for the BA program, students have the opportunity to become directly involved in any of the active research programs in the Department of Physics and Astronomy.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
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<td>HIST 105</td>
<td>History of the United States</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
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<td>PHYS 101</td>
<td>Freshman Physics Orientation</td>
<td>1</td>
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Spring

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<th>Semester</th>
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<td>Mechanics</td>
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Second Year

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<tr>
<td>Fall</td>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
<td>4</td>
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<td>MATH 308</td>
<td>Differential Equations</td>
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<td>PHYS 221</td>
<td>Optics and Thermal Physics</td>
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<td>POLS 206</td>
<td>American National Government</td>
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Spring

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td></td>
<td>PHYS 225</td>
<td>Electronic Circuits and Applications</td>
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<td>PHYS 309</td>
<td>Modern Physics</td>
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<td>PHYS 331</td>
<td>Theoretical Methods for Physicists I</td>
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Third Year

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<tr>
<td>Fall</td>
<td>PHYS 302</td>
<td>Advanced Mechanics I</td>
<td>3</td>
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<td>PHYS 304</td>
<td>Advanced Electricity and Magnetism I</td>
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<td>Theoretical Methods for Physicists II</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td></td>
<td>Language, philosophy and culture elective (p. 23)</td>
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Spring

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td></td>
<td>PHYS 327</td>
<td>Experimental Physics I</td>
<td>2</td>
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<td>PHYS 328</td>
<td>Experimental Physics II</td>
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<td>PHYS 412</td>
<td>Quantum Mechanics I</td>
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<td></td>
<td>Communication elective (p. 22)</td>
<td>3</td>
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<tr>
<td></td>
<td>Social and behavioral science elective (p. 25)</td>
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Fourth Year

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<th>Semester</th>
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<td>Science or technical elective</td>
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Spring

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td></td>
<td>PHYS 401</td>
<td>Computational Physics</td>
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<td>Creative arts elective (p. 24)</td>
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<td>Electives</td>
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<td>9</td>
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</table>

Total Semester Credit Hours 120
Any course in this category from the approved University Core Curriculum list of courses.

A physics major must complete the foundation courses (PHYS 101, PHYS 102, PHYS 208, PHYS 218, PHYS 221, PHYS 309, PHYS 331, CHEM 107/CHEM 117, MATH 171, MATH 172, MATH 221, MATH 308) with a grade of C or better and have a 2.0 cumulative GPR before taking non-foundation upper-level physics courses.

A minor field must be selected in conference with the student’s advisor. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to University Core Curriculum courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements.

Any approved Communication course.

To register for PHYS 401 a student must be able to program in a high level language, such as FORTRAN, Java or C. This prerequisite can be satisfied by taking CSCE 206 or the equivalent.

Ph.D. in Physics

Program Requirements

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Description</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
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<td>American history elective (p. 25)</td>
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<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
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<td>PHYS 101</td>
<td>Freshman Physics Orientation</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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<td>CHEM 107</td>
<td>General Chemistry for Engineering</td>
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<td>&amp; CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<td>American history elective (p. 25)</td>
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<td>MATH 172</td>
<td>Calculus</td>
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<td>PHYS 102</td>
<td>Freshman Physics Orientation II</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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### Second Year

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<tr>
<td>Fall</td>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
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<td>American National Government</td>
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<tr>
<th>Semester</th>
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<tr>
<td>Spring</td>
<td>PHYS 225</td>
<td>Electronic Circuits and Applications</td>
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<td></td>
<td>PHYS 309</td>
<td>Modern Physics</td>
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<td>PHYS 331</td>
<td>Theoretical Methods for Physicists I</td>
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<td></td>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<td></td>
<td>Communication elective (p. 22)</td>
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<td>Semester Credit Hours</td>
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<th>Semester</th>
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<td>Fall</td>
<td>PHYS 302</td>
<td>Advanced Mechanics I</td>
<td>3</td>
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<td>PHYS 304</td>
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<td>PHYS 303</td>
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<td>PHYS 305</td>
<td>Advanced Electricity and Magnetism II</td>
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<td>PHYS 412</td>
<td>Quantum Mechanics I</td>
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<td>Electives</td>
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<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Description</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>PHYS 408</td>
<td>Thermodynamics and Statistical Mechanics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 414</td>
<td>Quantum Mechanics II or PHYS 416</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Physics of the Solid State</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS 426</td>
<td>Physics Laboratory</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 491</td>
<td>Research or ASTR 491</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Research</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>13</td>
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</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Description</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>PHYS 401</td>
<td>Computational Physics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS 425</td>
<td>Physics Laboratory</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 491</td>
<td>Research or ASTR 491</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Research</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Stretch Science or technical elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Semester Credit Hours</td>
<td>120</td>
</tr>
</tbody>
</table>
A physics major must complete the foundation courses (PHYS 101, PHYS 102, PHYS 208, PHYS 221, PHYS 309, CHEM 107/CHEM 117, MATH 171, MATH 172, MATH 221, MATH 308) with a grade of C or better and have a 2.0 cumulative GPR before taking non-foundation upper-level physics courses.

Any approved Communication course.

Approved W course designation.

Maximum combination of 18 hours of 481, 482, 485 and/or 491.

To register for PHYS 401 a student must be able to program in a high level language, such as FORTRAN, Java or C. This prerequisite can be satisfied by taking CSCE 206 or the equivalent.

ASTR 314 or any 400-level physics, science or technical elective.

Electives should be chosen in consultation with the student’s advisor. If the student has not fulfilled the six hour international and cultural diversity Graduation requirement with courses used to meet areas of the Core, they must fulfill this requirement with six of their elective hours.

Any 300- or 400-level ASTR or PHYS elective.

Astrophysics - Minor

The Department of Physics and Astronomy offers a minor in astrophysics. Contact the department for more information.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>ASTR 314</td>
<td>Survey of Astronomy</td>
<td>3</td>
</tr>
<tr>
<td>ASTR 320</td>
<td>Astrophysical Research Methods</td>
<td>2</td>
</tr>
</tbody>
</table>

Directed electives

Select two of the following:

- ASTR 401 Stars and Extrasolar Planets
- ASTR 403 Extragalactic Astronomy and Cosmology
- ASTR 491 Research

Total Semester Credit Hours 15

1 May be taken in absentia.

Physics - Minor

The Department of Physics and Astronomy offers a minor in physics. Contact the department for more information.

Program Requirements

Students who wish to complete a minor in physics must satisfy the following requirements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 221</td>
<td>Optics and Thermal Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 309</td>
<td>Modern Physics</td>
<td>3</td>
</tr>
</tbody>
</table>
Statistics - BS

Dahm, Paul F, Professor
Statistics
PHD, Iowa State University, 1979

Gaynanova, Irina, Assistant Professor
Statistics
PHD, Cornell University, 2015

Hart, Jeffrey D, Professor
Statistics
PHD, Southern Methodist University, 1981

Hatfield, Lloyd K, Senior Lecturer
Statistics
MS, University of North Texas, 1980

Hernandez Magallanes, Irma Del Consue, Distinguished Professor
Statistics
PHD, University of California, Berkeley, 2015

Huang, Jianhua, Professor
Statistics
PHD, University of California, Berkeley, 1997

Johnson, Valen E, Professor
Statistics
PHD, University Of Chicago, 1989

Jones, Edward R, Executive Professor
Statistics
PHD, Virginia Polytechnic Institute and State University, 1976

Jun, Mikyoung, Associate Professor
Statistics
PHD, University of Chicago, 2005

Katzfuss, Matthias S, Assistant Professor
Statistics
PHD, The Ohio State University, 2011

Kincheloe, Faron, Visiting Professor
Statistics
MS, Baylor University, 2011

Kolodziej, Elizabeth Y, Instructional Assistant Professor
Statistics
PHD, Texas A&M University, 2010

Liang, Hwa Chi, Senior Lecturer
Statistics
PHD, University of New Mexico, 2003

Long, James P, Assistant Professor
Statistics
PHD, University of California, Berkeley, 2013

Longnecker, Michael T, Professor
Statistics
PHD, Florida State University, 1976

Mallick, Bani K, Distinguished Professor
Statistics
PHD, University of Connecticut, 1994

Mueller-Harknett, Ursula U, Professor
Statistics
PHD, Universitat Bremen, Germany, 2005

Newton, Howard J, Senior Professor
Statistics
PHD, State University of New York at Buffalo, 1975

Pourahmadi, Mohsen, Professor
Statistics
PHD, Michigan State University, 1980

Sang, Huiyan, Associate Professor
Statistics
PHD, Duke University, 2008

Schmiediche, Henrik, Instructional Associate Professor
Statistics
PHD, Texas A&M University, 1993

Sheather, Simon J, Professor
Statistics
PHD, La Trobe University, 1986

Sinha, Samiran, Professor
Statistics
PHD, University of Florida, 2004

Spiegelman, Clifford H, Distinguished Professor
Statistics
PHD, Northwestern University, 1976

Subbarao, Suhasini T, Professor
Statistics
PHD, University of Bristol, United Kingdom, 1999

Wang, Suojin, Professor
Statistics
PHD, The University of Texas at Austin, 1988

Wehrly, Thomas E, Professor
Statistics
PHD, University of Wisconsin - Madison, 1976

Zhang, Xianyang, Assistant Professor
Statistics
PHD, University of Illinois at Urbana-Champaign, 2013

Zhou, Lan, Associate Professor
Statistics
PHD, University of California, Berkeley, 1997

Majors

- Bachelor of Science in Statistics (p. 640)

Minors

- Minor in Statistics (p. 642)

Statistics - BS

Statistics is the science of collecting and analyzing data for the purpose of making decisions in the presence of uncertainty. Data are ubiquitous in the modern day and age, and statisticians are in high demand. Multidisciplinary application areas vary widely and include health and
medicine, business, engineering, physical sciences, environmental studies, and government. The curriculum in statistics provides instruction in all necessary areas, including a foundation in mathematics and probability, strategies for designing studies and collecting data, the visualization and analysis of data using popular software such as SAS and R, and the process of using sample data to draw conclusions about a population. Depending on the electives selected, a student completing this program will be prepared to enter employment as a statistical analyst or to continue to graduate school in statistics or a related field.

### Program Requirements

The following is a suggested schedule that includes the required courses for the BS in Statistics. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Science elective ¹</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td></td>
<td>14</td>
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</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>American history (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 172</td>
<td>Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>STAT 182</td>
<td>Foundations of Statistics</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Computer science elective ²</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Science elective ¹</td>
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<td>4</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
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<td>16</td>
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</table>

#### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Communication requirement ³</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Science elective ¹</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
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<td>16</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>MATH 304</td>
<td>Linear Algebra or MATH 323 Linear Algebra</td>
<td>3</td>
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<tr>
<td></td>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Computer science elective ²</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Elective hours ⁴</td>
<td></td>
<td>3</td>
</tr>
<tr>
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<td>Total Semester Credit Hours</td>
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<td>16</td>
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</table>

#### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>STAT 404</td>
<td>Statistical Computing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 414</td>
<td>Mathematical Statistics I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics elective ⁵</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Outside specialization elective ⁶</td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
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</tr>
</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>STAT 406</td>
<td>Design and Analysis of Experiments</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics or Statistics elective ⁵,⁷</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Statistics elective ⁷</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Outside specialization elective ⁶</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective hours ⁴</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
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<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>STAT 482</td>
<td>Statistics Capstone</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Statistics elective ⁷</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Outside specialization elective ⁶</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective hours ⁴</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

1. Two lower-level science courses are to be selected from ASTR 111; BIOL 111; BIOL 112; CHEM 101/CHEM 111 or CHEM 103/CHEM 113; CHEM 102/CHEM 112 or CHEM 104/CHEM 114; PHYS 208; PHYS 218. A third science course (p. 22) is to be selected from any course satisfying the life and physical sciences requirement for the University Core Curriculum.
2. Select 8 hours from CSCE 110, CSCE 111, CSCE 121, or CSCE 206.
3. Select 3 hours from COMM 203, COMM 205, or COMM 243, which fulfills the communication (p. 22) requirement for the University Core Curriculum (p. 21).
4. Three elective hours must be chosen from the approved University Core Curriculum list for language, philosophy and culture (p. 23), three elective hours must be chosen from the approved University Core Curriculum list for creative arts (p. 24), and three elective hours must be chosen from the approved University Core Curriculum list for social and behavior sciences (p. 25). In addition, 6 hours of courses must be in the area of international and cultural diversity (p. 40). These may be in addition to University Core Curriculum courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements.
5. Students must take at least one course from the following courses: MATH 220, MATH 308, MATH 409, MATH 410, MATH 417 or MATH 437, MATH 442, MATH 446, MATH 447, MATH 469, ISEN 320, ISEN 340, ISEN 355. The student must take a total of at least 12 hours of mathematics (p. 22) and statistics elective courses.
6. Students must take 12 hours in an outside specialization area upon approval by a departmental advisor. At least 6 hours must be upper level hours.
Students must take at least two courses from the following courses: STAT 407, STAT 426, STAT 436, STAT 438, STAT 445, STAT 446, STAT 459, STAT 485, STAT 489, STAT 491, ISEN 350. The student must take a total of at least 12 hours of mathematics and statistics elective courses.

*If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 220, MATH 304/MATH 323, STAT 211, or STAT 212, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two D’s in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

**Statistics - Minor**

The Department of Statistics offers a minor in Statistics. For additional information, see the Department of Statistics website (http://www.stat.tamu.edu).

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Lower Division Courses</strong></td>
<td></td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Directed Upper Division Electives</strong></td>
<td></td>
</tr>
<tr>
<td>Select three of the following:</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>STAT 404</td>
<td>Statistical Computing</td>
<td></td>
</tr>
<tr>
<td>STAT 406</td>
<td>Design and Analysis of Experiments</td>
<td></td>
</tr>
<tr>
<td>STAT 407</td>
<td>Principles of Sample Surveys</td>
<td></td>
</tr>
<tr>
<td>STAT 408</td>
<td>Introduction to Linear Models</td>
<td></td>
</tr>
<tr>
<td>STAT 414</td>
<td>Mathematical Statistics I</td>
<td></td>
</tr>
<tr>
<td>STAT 415</td>
<td>Mathematical Statistics II</td>
<td></td>
</tr>
<tr>
<td>STAT 426</td>
<td>Methods in Time Series Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 436</td>
<td>Multivariate Analysis and Statistical Learning</td>
<td></td>
</tr>
<tr>
<td>STAT 438</td>
<td>Bayesian Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 445</td>
<td>Applied Biostatistics and Data Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 446</td>
<td>Statistical Bioinformatics</td>
<td></td>
</tr>
<tr>
<td>STAT 459</td>
<td>Categorical Data Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 485</td>
<td>Directed Studies</td>
<td></td>
</tr>
<tr>
<td>STAT 489</td>
<td>Special Topics in...</td>
<td></td>
</tr>
</tbody>
</table>

| Total Semester Credit Hours | 15 |

1 STAT 485 or STAT 489 must be approved by the Statistics Department.

**Additional Requirements:**

Students must make a grade of "C" or better in all courses.

Substitutions for the minor must be approved by the Statistics Department.

---

**University Studies Programs**

The College of Science offers degrees in University Studies. A University Studies degree differs from a traditional "major" in that it consists of a concentration and two minors of 15-18 hours each. The University Studies degree format was created to provide students the flexibility to combine areas of study that are of special interest.

**Majors**

- Bachelor of Science in University Studies, Mathematics for Business Concentration (p. 642)
- Bachelor of Science in University Studies, Mathematics for Pre-Professionals Concentration (p. 643)
- Bachelor of Science in University Studies, Science for Secondary Teaching Concentration (p. 643)
- Bachelor of Science in University Studies, Mathematics for Teaching Concentration (p. 644)

**University Studies - BS, Mathematics for Business Concentration**

The Bachelor of Science in University Studies, Mathematics for Business area of concentration consists of courses that are designed to give students who are both interested in business and mathematically inclined a way to combine both interests.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 325</td>
<td>The Mathematics of Interest</td>
<td></td>
</tr>
<tr>
<td>MATH 425</td>
<td>The Mathematics of Contingent Claims</td>
<td></td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td></td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td></td>
</tr>
<tr>
<td>or MATH 220</td>
<td>or Several Variable Calculus</td>
<td></td>
</tr>
<tr>
<td>MATH 304</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>or MATH 323</td>
<td>or Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 442</td>
<td>Mathematical Modeling</td>
<td></td>
</tr>
<tr>
<td>or STAT 401</td>
<td>or Introduction to Linear Models</td>
<td></td>
</tr>
</tbody>
</table>

**University and College Requirements**

ENGL 104 | Communication | 3 |

Select one of the following:

- COMM 203 Public Speaking
- COMM 205 Communication for Technical Professions
- COMM 243 Argumentation and Debate

**Mathematics**

- MATH 151 | Engineering Mathematics I                     | 4 |
| or MATH 171 | or Analytic Geometry and Calculus             | |
| MATH 152 | Engineering Mathematics II                    | 4 |
| or MATH 17 | or Calculus                                   | |

Life and physical sciences (p. 22)
University Studies - BS, Mathematics for Pre-Professionals Concentration

The Bachelor of Science in University Studies, Mathematics for Pre-Professionals area of concentration consists of courses that are designed to give students who are both interested in pre-professional programs and mathematically inclined a way to combine both interests.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 409</td>
<td>Advanced Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Modern Algebra I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 414</td>
<td>Mathematical Statistics I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or MATH 41 or Mathematical Probability</td>
<td>3</td>
</tr>
<tr>
<td>MATH 304</td>
<td>Linear Algebra I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or MATH 323 or Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 407 - MATH 499 (<a href="http://catalog.tamu.edu/">http://catalog.tamu.edu/</a></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>graduate/course-descriptions/math)</td>
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</tr>
</tbody>
</table>

University and College Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Communication</td>
<td>3</td>
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</tbody>
</table>

Select one of the following:

- COMM 203 Public Speaking
- COMM 205 Communication for Technical Professions
- COMM 243 Argumentation and Debate
- MATH 151 Engineering Mathematics I
- or MATH 17 or Analytic Geometry and Calculus
- MATH 152 Engineering Mathematics II
- or MATH 172 or Calculus

Life and physical sciences (p. 22)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Minor 1</td>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>Minor 2</td>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>General Electives</td>
<td>16-22</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 120

1. Must make a grade of ‘C’ or better.
2. Completion of four semesters of upper-level ROTC may be substituted for three hours of the requirement.
3. Electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201,PHYS 202, PHYS 205, PSYC 301; STAT 201, STAT 301 - 303 (p. 970); STLC 102; URPN 200; WFSC 101).
4. Select 3 hours from any 200-499 level course.

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

University Studies - BS, Science for Secondary Teaching Concentration

The BS in University Studies, Science for Secondary Teaching area of concentration consists of courses that give students desiring secondary-school teaching credentials a solid foundation in life, earth and physical sciences. In particular, the courses chosen encompass the science composite areas test by the State of Texas and TExES. These are the courses currently required for the science composite certificate.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 201</td>
<td>Weather and Climate I</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Must make a grade of ‘C’ or better.
2. MATH 433 will not fulfill this requirement.
3. Select 3 hours from any 200-499 level course.
4. Completion of four semesters of upper-level ROTC may be substituted for three hours of this requirement.
5. Electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BSN 100; ISEN 101; KINE 199; LAND 101; MATH 102-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201,PHYS 202, PHYS 205, PSYC 301; STAT 201, STAT 301 - 303 (p. 970);STLC 102; URPN 200; WFSC 101).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ASTR 101 &amp; ASTR 102</td>
<td>Basic Astronomy and Observational Astronomy ¹</td>
<td>4</td>
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<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I ¹</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II ¹</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 203</td>
<td>Planet Earth ¹</td>
<td>3-4</td>
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<tr>
<td>or GEOL 101 or Principles of Geology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics ¹</td>
<td>4</td>
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<tr>
<td>or PHYS 21</td>
<td>or Mechanics</td>
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<tr>
<td>PHYS 202</td>
<td>College Physics ¹</td>
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<td>Select twelve hours from the following: ¹</td>
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<tr>
<td>BIOL 318</td>
<td>Chordate Anatomy</td>
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<td>BIOL 319</td>
<td>Integrated Human Anatomy and Physiology I</td>
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</tr>
<tr>
<td>BIOL 320</td>
<td>Integrated Human Anatomy and Physiology II</td>
<td></td>
</tr>
<tr>
<td>BIOL 328</td>
<td>Plants and People</td>
<td></td>
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<tr>
<td>BIOL 335</td>
<td>Invertebrate Zoology</td>
<td></td>
</tr>
<tr>
<td>BIOL 357</td>
<td>Ecology</td>
<td></td>
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<tr>
<td>BIOL 401</td>
<td>Critical Writing in Biology</td>
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<tr>
<td>Upper-level BIOL course for which prerequisites have been satisfied (p. 741)</td>
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<tr>
<td>CHEM 315</td>
<td>Fundamentals of Quantitative Analysis &amp; CHEM 318</td>
<td></td>
</tr>
<tr>
<td>and Quantitative Analysis Laboratory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 316</td>
<td>Quantitative Analysis &amp; CHEM 31</td>
<td></td>
</tr>
<tr>
<td>and Quantitative Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 362</td>
<td>Descriptive Inorganic Chemistry</td>
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</tr>
<tr>
<td>CHEM 383</td>
<td>Chemistry of Environmental Pollution</td>
<td></td>
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<tr>
<td>CHEM 415</td>
<td>Analytical Chemistry</td>
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<tr>
<td>Upper-level CHEM course for which prerequisites have been satisfied (p. 752)</td>
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<tr>
<td>GEOG 331</td>
<td>Geomorphology</td>
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<tr>
<td>GEOG 335</td>
<td>Pattern and Process in Biogeography</td>
<td></td>
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<tr>
<td>GEOG 360</td>
<td>Natural Hazards</td>
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<tr>
<td>GEOG 370/ MARS 370</td>
<td>Coastal Processes</td>
<td></td>
</tr>
<tr>
<td>Upper-level GEOG course for which prerequisites have been satisfied (p. 822)</td>
<td></td>
<td></td>
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<tr>
<td>GEOL 301</td>
<td>Mineral Resources</td>
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<tr>
<td>GEOL 306</td>
<td>Sedimentology and Stratigraphy</td>
<td></td>
</tr>
<tr>
<td>GEOL 308</td>
<td>Integrated Earth Science</td>
<td></td>
</tr>
<tr>
<td>GEOL 309</td>
<td>Introduction to Geological Field Methods</td>
<td></td>
</tr>
<tr>
<td>GEOL 310</td>
<td>Planetary Geology</td>
<td></td>
</tr>
<tr>
<td>GEOL 311</td>
<td>Principles of Geological Writing</td>
<td></td>
</tr>
<tr>
<td>GEOL 352/ GNSS in the Geosciences</td>
<td></td>
<td></td>
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<tr>
<td>GEOG 420</td>
<td>Environmental Geology</td>
<td></td>
</tr>
<tr>
<td>Upper-level GEOL course for which prerequisites have been satisfied (p. 826)</td>
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<tr>
<td>OCNG 401</td>
<td>Interdisciplinary Oceanography</td>
<td></td>
</tr>
<tr>
<td>Upper-level OCNG course for which prerequisites have been satisfied (p. 923)</td>
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**University and College Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Communication (p. 22)</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics</td>
<td>8</td>
</tr>
</tbody>
</table>

Select one of the following:

- MATH 151 Engineering Mathematics I
- MATH 147 Calculus I for Biological Sciences
- MATH 171 Analytic Geometry and Calculus

Select one of the following:

- MATH 152 Engineering Mathematics II
- MATH 148 Calculus II for Biological Sciences
- MATH 172 Calculus

Life and physical sciences

- ATMO 202 Weather and Climate Laboratory 1
- BIOL 111 Introductory Biology I 4
- BIOL 112 Introductory Biology II 4
- Language, philosophy and culture (with an ENGL prefix) (p. 23) 3
- Creative arts (p. 24) 3
- Social and behavioral sciences 3

Select one of the following:

- INST 210 Understanding Special Populations
- INST 222 Foundations of Education in a Multicultural Society
- SOCI 217 Introduction to Race and Ethnicity

American history (p. 25) 6

- POLS 206 American National Government ² 3
- POLS 207 State and Local Government ² 3

Minor 1 15-18

Minor 2 15-18

General Electives ³ 1-7

Total Semester Credit Hours 120

¹ Must make a grade of "C" or better.
² Completion of four semesters of upper-level ROTC may be substitute for three hours of this requirement.
³ Courses 100-499 not used elsewhere.

---

**University Studies - BS, Mathematics for Teaching Concentration**

The BS in University Studies, Mathematics for Teaching area of concentration consists of courses that are designed to give students desiring a secondary-school teaching credential a solid foundation in mathematics. In particular, the courses chosen encompass the mathematical areas tested by the State of Texas and TExES secondary mathematics examination. These are the courses currently required for the secondary mathematics teaching field at Texas A&M University.
# Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MATH 220</td>
<td>Foundations of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 375</td>
<td>Intermediate Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 376</td>
<td>Intermediate Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 403</td>
<td>Mathematics and Technology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 467</td>
<td>Modern Geometry</td>
<td>3</td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 304</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or MATH 323 or Linear Algebra</td>
<td></td>
</tr>
</tbody>
</table>

### University and College Requirements

**Communication (p. 22)**  
6 hours  

**Mathematics**  
8 hours  

Select one of the following:  
- MATH 151 Engineering Mathematics I  
- MATH 147 Calculus I for Biological Sciences  
- MATH 171 Analytic Geometry and Calculus  

Select one of the following:  
- MATH 152 Engineering Mathematics II  
- MATH 148 Calculus II for Biological Sciences  
- MATH 172 Calculus  

**PHYS 218** Mechanics  
4 hours  

**Life and physical sciences (p. 22)**  
5 hours  

**Language, philosophy and culture (p. 23)**  
3 hours  

**Creative arts (p. 24)**  
3 hours  

**Social and behavioral sciences (p. 25)**  
3 hours  

**American history (p. 25)**  
6 hours  

**POLS 206** American National Government  
3 hours  

**POLS 207** State and Local Government  
3 hours  

**Minor 1**  
15-18 hours  

**Minor 2**  
15-18 hours  

**General Electives**  
19-25 hours  

Total Semester Credit Hours  
120 hours

---

1. Make a grade of 'C' or better.  
2. Select 3 hours from any 200-499 level course.  
3. Completion of four semesters of upper-level ROTC may be substituted for three hours of the requirement.  
4. Electives may be selected from any 100-499 course not used elsewhere, (except ALED 125; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 101; BUSN 100; ISEN 101; KINE 199; LAND 101; MATH 101-166 (p. 885), MATH 304, MATH 309, MATH 311, MATH 367, MATH 368, MATH 375, MATH 376; PHYS 109/ASTR 109, PHYS 119/ASTR 119, PHYS 201, PHYS 202, PHYS 205; PSYC 301; STAT 201, STAT 301 - 303 (p. 970); STLC 102; URPN 200; WFSC 101).

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 3 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.
COLLEGE OF VETERINARY MEDICINE AND BIOMEDICAL SCIENCES

Administrative Officers
Dean - Eleanor M. Green, B.S., D.V.M.
Executive Associate Dean - Kenita S. Rogers, D.V.M., M.S.
Associate Dean for Professional Programs - Karen Cornell, D.V.M.
Associate Dean for Research and Graduate Studies - Robert Burghardt M.S., Ph.D.
Associate Dean for Undergraduate Education - Evelyn Tiffany-Castiglioni, Ph.D.
Assistant Dean of Undergraduate Education - Elizabeth Crouch, Ph.D.
Assistant Dean for Finance and Administration - Belinda S. Hale, M.B.A.
Director of Student Services for Professional Programs - Vacant

General Statement
The College of Veterinary Medicine & Biomedical Sciences consists of five academic departments: Veterinary Integrative Biosciences, Veterinary Large Animal Clinical Sciences, Veterinary Pathobiology, Veterinary Physiology and Pharmacology, and Veterinary Small Animal Clinical Sciences. Each department is administered by a department head, who is responsible to the Dean of Veterinary Medicine & Biomedical Sciences for all programs assigned or developed in the department, including teaching, research, extension and service.

A Veterinary Medical Teaching Hospital and Field Service Clinic are operated within the College to provide clinical laboratories for the veterinary medical educational program.

An extensive research program in animal health and disease is conducted by the faculty and staff of the college, and a substantial number of the teaching faculty members are engaged in research.

A veterinary extension program carries research information to veterinarians, animal owners, and others in the state and nation with the least possible delay. The faculty makes research information available to the students in the classroom and laboratories in a timely manner.

The typical land-grant institutional mandate of teaching, research, patient care and service provides the organizational framework necessary to meet the dynamics in the ever-changing field of veterinary medicine.

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees are available in the departments of the College of Veterinary Medicine & Biomedical Sciences. The programs are research-oriented but sufficiently flexible to permit intensive training in many areas of special training. Clinical specialty training programs are also available. These programs are designed to provide effective training in the areas of professional specialization.

Majors
College of Veterinary Medicine and Biomedical Sciences
- Bachelor of Science in Biomedical Sciences (p. 647)
- Bachelor of Science in University Studies, Biomedical Sciences Concentration (p. 654)

Minors
College of Veterinary Medicine and Biomedical Sciences
- Biomedical Sciences Minor (p. 650)

Certificates
College of Veterinary Medicine and Biomedical Sciences
- International Certificate in Cultural Competency and Communications in Spanish (p. 651)

Department of Veterinary Physiology and Pharmacology
- Biomedical Research and Development Certificate (p. 654)

Masters
College of Veterinary Medicine and Biomedical Sciences
- Master of Science in Biomedical Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/veterinary-medicine-biomedical-sciences/interdepartmental/biomedical-sciences-ms)
- Master of Science in Science and Technology Journalism (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/veterinary-medicine-biomedical-sciences/interdepartmental/science-technology-journalism-ms)

Department of Veterinary Integrative Biosciences
- Master of Science in Veterinary Public Health - Epidemiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/veterinary-medicine-biomedical-sciences/veterinary-integrative-biosciences/veterinary-public-health-epidemiology-ms)

Doctoral
College of Veterinary Medicine and Biomedical Sciences
- Doctor of Philosophy in Biomedical Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/veterinary-medicine-biomedical-sciences/interdepartmental/biomedical-sciences-phd)
Admission

1. A Biomedical Sciences (BIMS) major will be admitted into the upper-level courses according to the following criteria:
   a. Completion of a set of Common Body of Knowledge (CBK) courses (35 hours to include BIOL 111, BIOL 112, CHEM 101/111, CHEM 102/112, CHEM 227/237, CHEM 228/238, PHYS 201, PHYS 202 and MATH 131) with a grade of C or better in each course taken at Texas A&M. Any CBK course transferred in from a community college must have a minimum grade of a "B". Normally, for admission to BIMS upper-level courses, a student may have attempted a CBK course no more than twice.
   b. A minimum of 55 completed semester hours with a cumulative resident Grade Point Ratio (GPR) of 2.5 or better.
   Process: Each student upon completing 55–65 semester credit hours must have a degree audit to verify upper-level eligibility.

2. The Biomedical Sciences Program will continue to accept changes of major into BIMS according to current Texas A&M University policy, but restrict changes of major into the upper-level courses (BIMS) according to the criteria listed in item 1. Students in other majors requesting a change of major to the BIMS program must also fulfill the criteria in item 1. In addition, the dean must verify availability of resources necessary to insure the student’s full-time enrollment in required upper-level courses prior to admission to upper-level status. If such courses are not available, the student will be denied admission to Biomedical Sciences.

3. To enter BIMS upper-level courses, transfer students must have:
   a. A minimum GPR of 3.0 in CBK courses with a grade of B or better in each completed course if taken at a 2-year college. A grade of C is accepted from a 4-year college.
   b. Transfer students admitted under another major and wishing to change into BIMS must complete one semester of graded coursework at Texas A&M University with a cumulative resident GPR of 2.5 and must fulfill the criteria in item 1.
   c. Texas A&M change of majors with less than 55 hours must have at least 55 semester credit hours with a minimum cumulative GPR of 3.0.

4. Students seeking readmission will be considered on a case-by-case basis, according to current catalog policy. No quotas will be placed on readmission; however, the decision to readmit will be dependent on resource availability and University policy.

5. Any BIMS student admitted to upper-level courses who then falls below the 2.5 GPR requirement will not be considered in good academic standing in their major and will be placed on college probation. Students who achieve less than a 1.0 GPR in any semester are not eligible for college probation or grade warning status. All Biomedical Sciences majors must follow established probation rules for the Biomedical Sciences Program.

6. The Dean, Director or Department Head will reserve the right to waive CBK or GPR requirements within the criteria established in Texas A&M University Student Rules.

7. No courses other than BIMS 481, BIMS 484, VIBS 310, VIBS 311, or research/directed studies credits can be taken S/U to be used in the degree plan.

8. BIMS probation is determined at the end of the Spring semester. Students not meeting acceptable GPR requirements (2.5 BIMS majors with 55 or more hours or 2.0 area of concentration (USVM), BIMS majors with less than 55 hours) will be required to attend Texas A&M University that summer and repeat courses as needed to raise their GPR. Students who achieve less than a 1.0 GPR in any semester (BIMS or USVM) are not eligible for college probation or grade warning status.

9. Students may only attempt CVM courses a total of three (3) times.

Applied Science Option

Biomedical Sciences is a broad field of applied biology that is directed toward understanding health and disease. The curriculum is designed to provide a strong four-year education that emphasizes versatility of the graduate in the biological and medical sciences. A highly effective counseling program assists the students with the development of an individualized approach and course package that orients and prepares the students for entry into the medical, allied health field or graduate program of their choice. Such an approach enhances their educational experiences, improves their placement in professional and graduate programs, and facilitates their entry into the biomedical science job market.

Biomedical Sciences graduates enter professional programs in human medicine, veterinary medicine, dentistry, osteopathy, podiatry, optometry, and pharmacy. Some become medical technologists, physician assistants, nurses, and laboratory and research technicians. Others pursue radiation technology, hospital administration, and a wide variety of health-related fields. Many Biomedical Sciences students continue their education in graduate schools and specialize in various biology- and medicine-related disciplines. Other graduates are employed by clinical practices, industrial companies, government agencies, private foundations, public schools, colleges and certain aspects of business. Positions are available in pharmaceutical and drug marketing, research equipment manufacture and sales, food safety, biomedical research, disease control, zoonoses and epidemiology, laboratory animal care, zoo and aquatic animal supervision, health-related inspection and regulatory work. The BS in Biomedical Sciences is also awarded to students who complete the three year Early Admission Option to Professional Schools and one year of professional school.

Faculty

Bellinger, Larry L, Professor
Biomedical Sciences
PHD, University of California, Davis, 1974

Benson, M Douglas, Associate Professor
Biomedical Sciences
PHD, University of Michigan, 2000

Berry, Charles W, Professor
Biomedical Sciences
PHD, Baylor University College of Dentistry, 1973
### Program Requirements

#### First Year

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIMS 101</td>
<td>Introduction to Biomedical Science</td>
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<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I &amp; Fundamentals of Chemistry Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics elective (p. 22)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Social and behavioral sciences elective (p. 25)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
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**Spring**

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<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
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<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II &amp; Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>MATH 131</td>
<td>Mathematical Concepts—Calculus</td>
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<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>MATH 171</td>
<td>Analytic Geometry and Calculus</td>
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#### Second Year

**Fall**

<table>
<thead>
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<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<tr>
<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
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<tr>
<td>HIST 105</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>Creative arts elective (p. 24)</td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>17</td>
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</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 228 &amp; CHEM 238</td>
<td>Organic Chemistry II &amp; Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>HIST 106</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
<td>Language, philosophy and culture elective (p. 23)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>17</td>
</tr>
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</table>
### Third Year

**Fall**
- BICH 410 Comprehensive Biochemistry I 3
- BIMS 320/GENE 320 Biomedical Genetics 3
- VIBS 305 Biomedical Anatomy 4
- Select a BIMS directed elective from the list below 1
- Select a BIMS directed elective from the list below 2

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMS 110</td>
<td>One Health in Action</td>
<td>1</td>
</tr>
<tr>
<td>BIMS 201</td>
<td>Introduction to Phenotypic Expression in the Context of Human Medicine</td>
<td>2</td>
</tr>
<tr>
<td>BIMS 289</td>
<td>Special Topics in...</td>
<td>1-4</td>
</tr>
<tr>
<td>BIMS 291</td>
<td>Research</td>
<td>0-4</td>
</tr>
<tr>
<td>BIMS 392</td>
<td>Cooperative Education in Biomedical Science</td>
<td>2</td>
</tr>
</tbody>
</table>

### Spring
- BICH 411 Comprehensive Biochemistry II 3
- VIBS 310 Biomedical Writing 1
- VTPB 405 Biomedical Microbiology 5
- Select a BIMS directed elective from the list below 2
- Communication elective (p. 22) 2

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTPB 212</td>
<td>Genetics in the News</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 221</td>
<td>Great Diseases of the World</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 301/WFSC 327</td>
<td>Wildlife Diseases</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 303</td>
<td>Medical Communication in the International Community</td>
<td>2</td>
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</tbody>
</table>

**Semester Credit Hours** 15

### Fourth Year

**Fall**
- VIBS 311 Biomedical Explorations through Narrative 1
- STAT 302 Statistical Methods 3
- Select BIMS directed electives from the list below 2
- Free elective 2

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTPB 407</td>
<td>Advanced Veterinary Microbiology Laboratory</td>
<td>1-3</td>
</tr>
<tr>
<td>VTPB 408</td>
<td>Clinical Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>VTPB 409</td>
<td>Introduction to Immunology</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 410</td>
<td>Cell Mechanisms of Disease</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 412</td>
<td>Techniques of Clinical Pathology</td>
<td>4</td>
</tr>
<tr>
<td>VTPB 415</td>
<td>Immunogenetics and Comparative Immunology</td>
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<tr>
<td>VTPB 421</td>
<td>Infectious Diseases of Humans and Animals</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 438</td>
<td>Biomedical Virology</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 452</td>
<td>Clinical Veterinary Mycology</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 454/MARB 454</td>
<td>Ornamental Fish Health</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 450</td>
<td>Stem Cell Physiology</td>
<td>3</td>
</tr>
<tr>
<td>VTPB 487/BIOL 487</td>
<td>Biomedical Parasitology</td>
<td>4</td>
</tr>
<tr>
<td>VTPP 123</td>
<td>Foundations of Physiology</td>
<td>3</td>
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<tr>
<td>VTPP 223</td>
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<td>VTPP 234</td>
<td>Design of Models for Physiology Research</td>
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<tr>
<td>VTPP 281</td>
<td>Seminar</td>
<td>4</td>
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<tr>
<td>VTPP 401</td>
<td>History of Human and Veterinary Medicine in Europe</td>
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<tr>
<td>VTPP 424/VIBS 424</td>
<td>Biomedical Neuroendocrinology and Endocrine Disorders</td>
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<td>VTPP 439</td>
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<td>Practicum in Biomedical Research</td>
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<td>VTPP 450</td>
<td>Stem Cell Physiology</td>
<td>3</td>
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<tr>
<td>VTPP 452</td>
<td>Fetal and Embryo Physiology</td>
<td>3</td>
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**Semester Credit Hours** 15

<table>
<thead>
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<tr>
<td>VTPP 407</td>
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<tr>
<td>VTPP 452</td>
<td>Fetal and Embryo Physiology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Semester Credit Hours** 13

**Total Semester Credit Hours** 120

---

1 Must be chosen in consultation with BIMS academic advisor.
2 Check with your BIMS academic advisor to select the correct courses.

In satisfying the required 26 hours of BIMS directed electives and free electives, all 285/485 courses may not exceed 6 credit hours and all 289/489 courses may not exceed 9 credit hours. A 289/489 course used as a free elective may not exceed 3 hours. A 291/491 course may not exceed 3 hours credit.

### Directed Electives

BIMS directed electives are courses that constitute the major offered by the College of Veterinary Medicine and Biomedical Sciences and those approved for biomedical science electives. A student may choose 26 semester credits from the following partial list of courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMS 481</td>
<td>Seminar in Biomedical Science</td>
<td>1</td>
</tr>
<tr>
<td>BIMS 405/GENE 405</td>
<td>Mammalian Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIMS 421/GENE 421</td>
<td>Advanced Human Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIMS 452/GENE 452</td>
<td>Modifying Mammalian Genomes for Biomedical Research</td>
<td>3</td>
</tr>
<tr>
<td>BIMS 484</td>
<td>Biomedical Science Field Experience</td>
<td>2</td>
</tr>
<tr>
<td>BIMS 489</td>
<td>Special Topics in...</td>
<td>1-4</td>
</tr>
<tr>
<td>VTPB 212</td>
<td>Genetics in the News</td>
<td>3</td>
</tr>
<tr>
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<tr>
<td>VTPP 452</td>
<td>Fetal and Embryo Physiology</td>
<td>3</td>
</tr>
</tbody>
</table>
A complete list of all BIMS directed electives may be obtained from a BIMS advisor.

**Biomedical Sciences - Minor**

Students declaring a Biomedical Sciences (BIMS) minor must declare the minor through the BIMS academic advising office.

**Requirements to declare BIMS minor:**

- Must have a 2.0 TAMU GPA
- Must be declared before 75 hours are completed

**Program Requirements**

A selection from among the following courses will constitute a minor field of study. The following 15 hours of course work are required. Proper classification must be met for the course level being taken.
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTPB 485</td>
<td>Directed Studies</td>
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<tr>
<td>VTPB 487/ BIOL 487</td>
<td>Biomedical Parasitology</td>
<td></td>
</tr>
<tr>
<td>VTPB 489</td>
<td>Special Topics in...</td>
<td></td>
</tr>
<tr>
<td>VTPP 424/ VIBS 424</td>
<td>Biomedical Neuroendocrinology and Endocrine Disorders</td>
<td></td>
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<tr>
<td>VTPP 425</td>
<td>Pharmacology</td>
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<td>VTPP 427</td>
<td>Biomedical Physiology II</td>
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</tr>
<tr>
<td>VTPP 429</td>
<td>Introduction to Toxicology</td>
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</tr>
<tr>
<td>VTPP 485</td>
<td>Directed Studies</td>
<td></td>
</tr>
<tr>
<td>VTPP 489</td>
<td>Special Topics in...</td>
<td></td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 15

1. BIMS Directed Electives are taken in consultation with a BIMS Academic Advisor.

Must have a 2.0 TAMU GPA

International Certificate in Cultural Competency and Communications in Spanish

Students who complete this certificate will be functionally bilingual and able to perform linguistically in a culturally sensitive manner within the biomedical environment. A required study abroad will allow students to gain experiential knowledge, expanding their cultural sensitivities and functionality in a foreign environment. Because of limited resources, the program will have a cap on the number of students admitted. All courses in the program must be completed with a grade of C or better. The certificate will be awarded upon completion of a BS degree in Biomedical Sciences.

Program Requirements

To earn the certificate, students are required to complete:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN 201</td>
<td>Intermediate Spanish I ¹</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 202</td>
<td>Intermediate Spanish II ¹</td>
<td>3</td>
</tr>
<tr>
<td>SPAN 300/SPAN 400 level course of the student’s choice ²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3 credit hours of area studies from an approved course list ³</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Minimum of 2 credit hours in a medical communications Area ⁴</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>BIMS 485 ⁵</td>
<td>An international experience approved by the Biomedical Sciences Program ⁶</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours 16

¹ SPAN 221 and SPAN 222 are acceptable substitutions, when taken abroad, for SPAN 201 and SPAN 202.

² Prerequisites apply.

³ The certificate was designed with the student’s required Texas A&M Core Curriculum (p. 21) in mind. Many of the courses on the approved list will count as a language, philosophy and culture, creative arts, or social and behavioral sciences. It is up to the student to compare the two lists and to work with their academic advisor to choose courses appropriate to their degree plan.

⁴ It is suggested that students enroll in this course after the completion of at least SPAN 201 or equivalent. For course options, see academic advisor.

⁵ This course is a specific section of 485 that requires shadowing in the biomedical environment while using the Spanish language.

⁶ This requirement may be satisfied by an approved study abroad program.

Department of Small Animal Clinical Sciences

http://vetmed.tamu.edu/vscs

Department of Veterinary Integrative Biosciences

http://vetmed.tamu.edu/vibs

Department of Veterinary Large Animal Clinical Sciences

http://vetmed.tamu.edu/vlcs

Department of Veterinary Pathobiology

http://vetmed.tamu.edu/vtpb

Faculty

Adams, Leslie G, Senior Professor
Veterinary Pathobiology
PHD, Texas A&M University, 1968
DVM, Texas A&M University, 1964

Arenas, Angela M, Assistant Professor
Veterinary Pathobiology
PHD, Texas A&M University, 2007
DVM, La Salle University, Colombia, 2002

Brightsmith, Donald J, Associate Professor
Veterinary Pathobiology
PHD, Duke University, 1999

Clubb, Fred J, Clinical Professor
Veterinary Pathobiology
PHD, The University of Alabama at Birmingham, 1983
DVM, Auburn University, 1971

Cook, Walter E, Clinical Associate Professor
Veterinary Pathobiology
PHD, University of Wyoming, 1999
DVM, University of California at Davis, 1994
Criscitiello, Michael F, Associate Professor
Veterinary Pathobiology
PHD, University of Miami, 2003

Derr, James N, Professor
Veterinary Pathobiology
PHD, Texas A&M University, 1990

Dindot, Scott V, Associate Professor
Veterinary Pathobiology
PHD, Texas A&M University, 2003

Edwards, John F, Professor
Veterinary Pathobiology
PHD, Cornell University, 1983
DVM, The Ohio State University, 1974

Esteve-Gasent, Maria D, Assistant Professor
Veterinary Pathobiology
PHD, Universidad de Valencia, Spain, 2003

Jeter, Elizabeth A, Lecturer
Veterinary Pathobiology
DVM, Texas A&M University, 1982

Johnson, Mark C, Clinical Professor
Veterinary Pathobiology
DVM, Texas A&M University, 1988

Kier, Ann B, Senior Professor
Veterinary Pathobiology
PHD, University of Missouri - Columbia, 1979
DVM, Texas A&M University, 1974

Krecek, Rosina C, Visiting Professor
Veterinary Pathobiology
PHD, University of Pretoria, 1985

Lawhon, Sara D, Associate Professor
Veterinary Pathobiology
PHD, North Carolina State University, 2003
DVM, Texas A&M University, 1997

Levine, Gwendolyn J, Clinical Associate Professor
Veterinary Pathobiology
DVM, Texas A&M University, 2006

Locke, Unity B, Assistant Professor
Veterinary Pathobiology
PHD, Iowa State University, 2011
BA VetMB, University of Cambridge, 2008

Logan, Linda L, Professor
Veterinary Pathobiology
PHD, University of California, Davis, 1987
DVM, Texas A&M University, 1976

Lupiani, Blanca M, Professor
Veterinary Pathobiology
PHD, University of Maryland, 1994

Mulenga, Albert, Professor
Veterinary Pathobiology
PHD, Hokkaido University, 1999
MVM, University of Liverpool, 1993
BVM, University of Zambia, 1990

Musser, Jeffrey M, Clinical Professor
Veterinary Pathobiology
PHD, North Carolina State University, 2000
DVM, VA-MD Regional College of Veterinary Medicine, 1989

Nabity, Mary B, Assistant Professor
Veterinary Pathobiology
PHD, Texas A&M University, 2010
DVM, Cornell University, 2002

Omran, Mohamed T, Clinical Assistant Professor
Veterinary Pathobiology
PHD, Texas A&M University, 1995

Payne, Susan L, Associate Professor
Veterinary Pathobiology
PHD, Louisiana State University, 1983

Pool, Roy R, Clinical Professor
Veterinary Pathobiology
PHD, University of California, Davis, 1967
DVM, Oklahoma State University, 1964

Porter, Brian F, Clinical Associate Professor
Veterinary Pathobiology
DVM, Texas A&M University, 1992

Rech, Raquel R, Clinical Assistant Professor
Veterinary Pathobiology
PHD, Federal University of Santa Maria (UFSM), 2007
DVM, Santa Catarina State University, 1999

Reddy, Sanjay M, Professor
Veterinary Pathobiology
PHD, University of Maryland, 1994
BVSc, Andhra Pradesh Agricultural University, India, 1986

Rivera, Gonzalo M, Associate Professor
Veterinary Pathobiology
PHD, Cornell University, 2002
DVM, National University of Rio Cuarto, Argentina, 1988

Rodrigues Hoffmann, Aline, Assistant Professor
Veterinary Pathobiology
PHD, Texas A&M University, 2011
DVM, Universidade Federal de Santa Maria, Brazil, 2004

Rogovskyy, Artem S, Assistant Professor
Veterinary Pathobiology
PHD, Washington State University, 2014
DVM, National Agricultural University, Ukraine, 2001

Russell, Karen E, Professor
Veterinary Pathobiology
PHD, North Carolina State University, 1997
DVM, VA-MD Regional College of Veterinary Medicine, 1990
Faculty

Bailey, Everett M, Professor
Veterinary Physiology & Pharmacology
PHD, Iowa State University, 1968
DVM, Texas A&M University, 1964

Blue-Mclendon, Alice, Clinical Associate Professor
Veterinary Physiology & Pharmacology
DVM, Texas A&M University, 1989

Dongaonkar, Ranjeet M, Assistant Professor
Veterinary Physiology & Pharmacology
PHD, Texas A&M University, 2008

Fajt, Virginia R, Clinical Associate Professor
Veterinary Physiology & Pharmacology
PHD, Iowa State University, 2000
DVM, Auburn University, 1995

Golding, Michael C, Associate Professor
Veterinary Physiology & Pharmacology
PHD, Texas A&M University, 2003

Han, Guichun, Clinical Assistant Professor
Veterinary Physiology & Pharmacology
PHD, Dalian Medical University, China, 2002

Heaps, Cristine L, Associate Professor
Veterinary Physiology & Pharmacology
PHD, University of Missouri - Columbia, 1999

Herman, James D, Clinical Professor
Veterinary Physiology & Pharmacology
PHD, Texas A&M University, 1995
DVM, Texas A&M University, 1989

Hinrichs, Katrin, Professor
Veterinary Physiology & Pharmacology
PHD, University of Pennsylvania, 1988

Ivanov, Ivan V, Clinical Associate Professor
Veterinary Physiology & Pharmacology
PHD, University of South Florida, 1999

Jones, Daniel H, Associate Professor
Veterinary Physiology & Pharmacology
PHD, University of Guelph, 1976

Kraemer, Duane C, Senior Professor
Veterinary Physiology & Pharmacology
PHD, Agricultural & Mechanical College (TAMU), 1966

Long, Charles R, Professor
Veterinary Physiology & Pharmacology
PHD, University of Massachusetts Amherst, 1996

Muneoka, Ken, Professor
Veterinary Physiology & Pharmacology
PHD, University of California, Irvine, 1983

Newell-Fugate, Anne E, Assistant Professor
Veterinary Physiology & Pharmacology
PHD, University of Illinois at Urbana-Champaign, 2012
DVM, North Carolina State, 2004

Department of Veterinary Physiology and Pharmacology

http://vetmed.tamu.edu/vtpp
Patterson, Carly A, Clinical Assistant Professor
Vet Physiology & Pharmacology
DVM, University of Illinois at Urbana-Champaign, 2011

Quick, Christopher M, Professor
Vet Physiology & Pharmacology
PHD, Rutgers, The State University of New Jersey, 1999

Ramadoss, Jayanth, Assistant Professor
Vet Physiology & Pharmacology
PHD, Texas A&M University, 2007

Safe, Stephen H, Distinguished Professor
Vet Physiology & Pharmacology
PHD, University of Oxford, 1966

Schroeder, Friedhelm, Senior Professor
Vet Physiology & Pharmacology
PHD, Michigan State University, 1974

Stallone, John N, Professor
Vet Physiology & Pharmacology
PHD, University of Arizona, 1984

Stewart, Randolph H, Clinical Professor
Vet Physiology & Pharmacology
PHD, Texas A&M University, 1997
DVM, Texas A&M University, 1983

Suva, Larry J, Professor
Vet Physiology & Pharmacology
PHD, The University of Melbourne, Australia, 2016

Tian, Yanan, Associate Professor
Vet Physiology & Pharmacology
PHD, Rutgers, The State University of New Jersey, 1993

Washburn, Shannon E, Clinical Associate Professor
Vet Physiology & Pharmacology
PHD, Texas A&M University, 2010
DVM, Texas A&M University, 1994

Wasser, Jeremy S, Associate Professor
Vet Physiology & Pharmacology
PHD, Indiana University, 1985

Westhusin, Mark E, Professor
Vet Physiology & Pharmacology
PHD, Texas A&M University, 1986

Yu, Ling, Research Associate Professor
Vet Physiology & Pharmacology
PHD, Nanjing Agricultural University, 2001

### Certificates

- Biomedical Research and Development Certificate (p. 654)

### Biomedical Research and Development - Certificate

The Biomedical Research Certificate, offered by the Department of Veterinary Physiology and Pharmacology, will provide students the opportunity to gain advanced training in biomedical research. Students in the Certificate Program will gain a broader understanding of the creation, evaluation, and dissemination of new knowledge while performing publishable original biomedical research within a research-intensive community. The Biomedical Research Certificate Program requires a minimum of 18-credit hours in designated courses, each of which includes engagement in inquiry-based research. Specific certificate requirements are available in the Biomedical Sciences Office and the Department of Veterinary Physiology and Pharmacology (http://vetmed.tamu.edu/vtpp).

#### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>VTPP 123</td>
<td>Foundations of Physiology</td>
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<tr>
<td>VTPP 491</td>
<td>Research</td>
<td>6</td>
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<tr>
<td>VTPP 444</td>
<td>Practicum in Biomedical Research</td>
<td>3</td>
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Prescribed Elective Courses: 6

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>VTPP 223</td>
<td>Design of Experiments for Physiology Research</td>
</tr>
<tr>
<td>or VTPP 224</td>
<td>or In Vitro Experimentation in Physiology Research</td>
</tr>
<tr>
<td>VTPP 234</td>
<td>Design of Models for Physiology Research</td>
</tr>
<tr>
<td>or VTPP 235</td>
<td>or Analysis and Validation of Models for Physiology Research</td>
</tr>
</tbody>
</table>

Total Semester Credit Hours: 18

1. Two VTPP 491 (3 hours) courses are required for 6 hours total.

### University Studies Programs

The College of Veterinary Medicine and Biomedical Sciences offers a Bachelor of Science in University Studies degree with a concentration in biomedical sciences. Contact the college for more information.

### Majors

- Bachelor of Science in University Studies, Biomedical Sciences Concentration (p. 654)

### University Studies - BS, Biomedical Sciences Concentration

The College of Veterinary Medicine and Biomedical Sciences offers a Bachelor of Science in University Studies degree with a concentration in biomedical sciences.

#### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>BIMS 320/GENE 320</td>
<td>Biomedical Genetics</td>
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Select from the following: 4

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<tbody>
<tr>
<td>BIMS 421/GENE 421</td>
<td>Advanced Human Genetics</td>
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<tr>
<td>VIBS 310</td>
<td>Biomedical Writing</td>
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<td>Course Title</td>
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<tr>
<td>VIBS 311</td>
<td>Biomedical Explorations through Narrative</td>
</tr>
<tr>
<td>VIBS 432</td>
<td>Public Health Practices</td>
</tr>
<tr>
<td>VIBS 443</td>
<td>Biology of Mammalian Cells and Tissues</td>
</tr>
<tr>
<td>VTPB 409</td>
<td>Introduction to Immunology</td>
</tr>
<tr>
<td>VTPB 487/</td>
<td>Biomedical Parasitology</td>
</tr>
<tr>
<td>BIOL 487</td>
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<tr>
<td>VTPB 405</td>
<td>Biomedical Microbiology</td>
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<tr>
<td>VTPP 323</td>
<td>Animal Physiology</td>
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<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>&amp; CHEM 111</td>
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<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
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<td>&amp; CHEM 112</td>
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<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<td>BIMS Directed Electives</td>
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<td>ANSC 107</td>
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<td>ANSC 108</td>
<td>General Animal Science</td>
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<tr>
<td>ANSC 210</td>
<td>Companion Animal Science</td>
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<tr>
<td>ANSC 303/</td>
<td>Principles of Animal Nutrition</td>
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<tr>
<td>NUTR 303</td>
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<tr>
<td>ANSC 318</td>
<td>Feeds and Feeding</td>
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<tr>
<td>ANSC 320</td>
<td>Animal Nutrition and Feeding</td>
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<tr>
<td>BICH 412</td>
<td>Biochemistry Laboratory I</td>
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<tr>
<td>BICH 414</td>
<td>Biochemical Techniques I</td>
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<tr>
<td>BIMS 110</td>
<td>One Health in Action</td>
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<tr>
<td>BIMS 201</td>
<td>Introduction to Phenotypic Expression in the Context of Human Medicine</td>
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<tr>
<td>BIMS 289</td>
<td>Special Topics in...</td>
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<td>BIMS 291</td>
<td>Research</td>
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<td>BIMS 392</td>
<td>Cooperative Education in Biomedical Science</td>
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<td>BIMS 405/</td>
<td>Mammalian Genetics</td>
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<td>GENE 405</td>
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<td>BIMS 421/</td>
<td>Advanced Human Genetics</td>
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<td>GENE 421</td>
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<tr>
<td>BIMS 452/</td>
<td>Modifying Mammalian Genomes for Biomedical Research</td>
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<td>GENE 452</td>
<td>Biomedical Research</td>
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<tr>
<td>BIMS 481</td>
<td>Seminar in Biomedical Science</td>
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<tr>
<td>BIMS 484</td>
<td>Biomedical Science Field Experience</td>
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<tr>
<td>BIMS 485</td>
<td>Directed Studies</td>
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<td>BIMS 489</td>
<td>Special Topics in...</td>
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<td>Research</td>
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<td>ENTO 208</td>
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<td>ENTO 210</td>
<td>Global Public Health Entomology</td>
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<td>ENTO 423</td>
<td>Medical Entomology</td>
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<td>ENTO 431/</td>
<td>The Science of Forensic Entomology</td>
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<td>FIVS 431</td>
<td>Entomology</td>
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<td>Applied Forensic Entomology</td>
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<td>FIVS 432</td>
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<td>Advanced Human Genetics</td>
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<td>BIMS 421</td>
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<td>GENE 431</td>
<td>Molecular Genetics</td>
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<td>BICH 431</td>
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<td>GENE 432/</td>
<td>Laboratory in Molecular Genetics</td>
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<td>BICH 432</td>
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<tr>
<td>GENE 450</td>
<td>Recombinant DNA and Biotechnology</td>
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<tr>
<td>NUTR 222</td>
<td>Nutrition for Health and Health Care</td>
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<td>URPN 370</td>
<td>Health Systems Planning</td>
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<td>VIBS 204</td>
<td>Fundamentals of Food Toxicology and Safety</td>
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<td>VIBS 277/</td>
<td>Introduction to Neuroscience</td>
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<td>NRSC 277</td>
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<td>VIBS 310</td>
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<td>VIBS 311</td>
<td>Biomedical Explorations through Narrative</td>
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<td>VIBS 343</td>
<td>Histology</td>
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<td>VIBS 401</td>
<td>Developmental Neurotoxicology</td>
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<td>VIBS 404</td>
<td>Food Toxicology and Safety</td>
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<td>VIBS 411</td>
<td>Tumor Cell Biology and Carcinogenesis</td>
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<td>VIBS 413</td>
<td>Introduction to Epidemiology</td>
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<td>VIBS 420</td>
<td>Computer Applications in Public Health Research</td>
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<td>VIBS 432</td>
<td>Public Health Practices</td>
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<td>VIBS 443</td>
<td>Biology of Mammalian Cells and Tissues</td>
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<td>Mammalian Functional Neuroanatomy</td>
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<td>Neuroanatomy</td>
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<td>VTPB 301/</td>
<td>Wildlife Diseases</td>
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<td>WFSC 327</td>
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<td>VTPB 303</td>
<td>Medical Communication in the International Community</td>
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<td>VTPB 334</td>
<td>Poultry Diseases</td>
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<td>VTPB 408</td>
<td>Clinical Microbiology</td>
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<tr>
<td>VTPB 409</td>
<td>Introduction to Immunology</td>
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<tr>
<td>VTPB 410</td>
<td>Cell Mechanisms of Disease</td>
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<td>VTPB 412</td>
<td>Techniques of Clinical Pathology</td>
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<td>VTPB 415</td>
<td>Immunogenetics and Comparative Immunology</td>
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<td>VTPB 421</td>
<td>Infectious Diseases of Humans and Animals</td>
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<tr>
<td>VTPB 438</td>
<td>Biomedical Virology</td>
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<td>VTPB 452</td>
<td>Clinical Veterinary Mycology</td>
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<td>VTPB 454/</td>
<td>Ornamental Fish Health</td>
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<td>MARB 454</td>
<td>Management</td>
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<td>VTPP 424/</td>
<td>Biomedical Neuroendocrinology</td>
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<td>VIBS 424</td>
<td>and Endocrine Disorders</td>
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<tr>
<td>VTPP 401</td>
<td>History of Human and Veterinary Medicine in Europe</td>
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<tr>
<td>VTPP 425</td>
<td>Pharmacology</td>
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<td>VTPP 427</td>
<td>Biomedical Physiology II</td>
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<td>VTPP 429</td>
<td>Introduction to Toxicology</td>
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<tr>
<td>VTPP 438</td>
<td>Analysis of Genomic Signals</td>
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<td>WFSC 327/</td>
<td>Wildlife Diseases</td>
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<td>VTPB 301</td>
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**University and College Requirements**

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<thead>
<tr>
<th>Requirement</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Communication (p. 22)</td>
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<tr>
<td>Mathematics (p. 22)</td>
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<td>Mathematics Elective</td>
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<td>Select one of the following:</td>
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<td>MATH 131 Mathematical Concepts—Calculus</td>
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<td>MATH 142 Business Calculus</td>
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<tr>
<td>MATH 151 Engineering Mathematics I</td>
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<td>MATH 171 Analytic Geometry and Calculus</td>
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<td>BIOL 111 Introductory Biology I</td>
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<td>BIOL 112 Introductory Biology II</td>
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<td>CHEM 237 Organic Chemistry Laboratory</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
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<tr>
<td>Creative Arts (p. 24)</td>
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<tr>
<td>Social and behavioral sciences (p. 25)</td>
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<tr>
<td>American history (p. 25)</td>
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<td>POLS 206 American National Government</td>
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<td>POLS 207 State and Local Government</td>
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<td>Remaining Coursework</td>
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<td>General electives</td>
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<td>Minor 1</td>
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<td>Minor 2</td>
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<tr>
<td>Total Semester Credit Hours</td>
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1. Up to 4 course hours may be selected from BIMS 484, BIMS 485, VIBS 285, VIBS 485, VIBS 489; VLCS 485; VSCS 485; VTPB 285, VTPB 485, VTPP 489; VTPP 285, VTPP 481, VTPP 485, VTPP 489.
2. Completion of four semesters of upper-level ROTC may be substituted for 3 hours of American history and 3 hours of political science.
3. Includes 30-36 hours used to satisfy the two minor requirements and 2 to 8 hours of general electives.
4. Select 2 to 8 hours of any 100-499 course not used elsewhere.
SCHOOL OF MILITARY SCIENCE

Administrative Officers
Commandant - Brigadier General Joe E. Ramirez, Jr., USA, M.S.

General Statement
The School of Military Sciences is composed of three departments: Aerospace Studies, Military Science and Naval Science.

All courses offered by the School of Military Sciences are accredited by the University. However, the credit granted for degree plans varies by college and often by department. For precise information, consult the associate dean or department head.

The University’s commitment to providing highly skilled and disciplined leaders to the Armed Forces requires all students enrolled in ROTC programs at Texas A&M to be members of the Corps of Cadets.

Students not enrolled in an ROTC program may be permitted to take ROTC courses as electives with the advance approval of the professor of military science, the professor of aerospace studies, or the professor of naval science, as appropriate, and the concurrence of the head of the School of Military Sciences.

State law permits the substitution of 3 hours of history and 3 hours of political science for a student in the program of an approved senior ROTC unit. With the approval of the dean of the appropriate college, students successfully completing their required four semesters of upper-level ROTC curriculum will be deemed to have completed the equivalent of POLS 206 or POLS 207 plus HIST 105 or HIST 106 (or another appropriate course) for a total of 6 hours. Students pursuing teacher certification are not allowed to substitute ROTC credits for this requirement.

Departments
Aerospace Studies (p. 657)
Military Science (p. 658)
Naval Science (p. 658)

Minors
- Military Studies Minor (p. 660)

Certificates
- Leadership Study and Development Certificate (p. 661)

Aerospace Studies
The Air Force ROTC (AFROTC) program at Texas A&M University is the largest AFROTC program in the United States and is designed to prepare selected students to be commissioned officers in the United States Air Force.

The institutional phase of AFROTC, called aerospace studies, is divided into two parts. The first two years constitute the General Military Course and the second two years constitute the Professional Officer Course. Details on courses offered are set forth in the alphabetical departmental listing. Concurrent enrollment in more than one aerospace studies course requires the approval of the department head, also known as the Professor of Aerospace Studies.

The General Military Course consists of the 100- and 200-level courses. These courses focus on the structure and missions of Air Force organizations; officership and professionalism; and, include an introduction to communicative skills. The General Military Course prepares the cadet, as a candidate, for the Professional Officer Course (POC). Cadets in the General Military Course attend one hour of class plus two hours of leadership lab per week.

Students apply for enrollment in the Professional Officer Course during their sophomore year. Enrollment in the Professional Officer Course at the beginning of the junior year is limited to students of high moral character who are academically qualified, physically fit, possess the necessary interest and aptitude, and have demonstrated leadership potential.

Before entry into the Professional Officer Course, cadets must attend AFROTC Field Training during the summer months typically between the sophomore and junior academic years. The major areas of study in the Field Training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions, Air Force environment, physical fitness training, and a culmination field training exercise. Those who complete Field Training are enlisted in the Air Force Reserve and enter the POC.

The purpose of the Professional Officer Course is to develop skills and attitudes vital to a career as a professional Air Force officer. A degree is a prerequisite for an Air Force commission. Cadets attend class three hours a week and leadership lab two hours per week during each semester of the Professional Officer Course.

If a student is selected for and enrolled in the Professional Officer Course, he or she must sign a contract with the government in which he or she agrees to enlist in the Air Force Reserve, complete the course and, upon graduation, accept a commission as an officer in the United States Air Force. He or she also must agree to serve on active duty for not less than four years after being commissioned. Persons selected for flight training must serve ten years of active duty following completion of pilot training. During their two years in the Professional Officer Course, cadets are eligible to receive monthly subsistence pay, plus added monetary incentives.

Leadership training is continuous during the student’s life as an AFROTC cadet. One way this is accomplished is through Leadership Laboratory. Instruction is conducted within the framework of an organized cadet corps with a progression of experiences designed to develop each student’s leadership potential. Leadership Laboratory involves a study of Air Force customs and courtesies, drill and ceremonies, Air Force career opportunities, and expectations of an Air Force junior officer. Students develop their leadership in a practical, supervised laboratory, which typically includes field trips to Air Force installations.

Students enrolled in the four-year program may apply and compete for two- or three-year AFROTC College Scholarships. The AFROTC In-College Scholarship Program is a highly competitive program aimed primarily at college freshmen and sophomores in any major. If selected for an AFROTC scholarship, the student will receive tuition payment, textbook allowance and monthly subsistence allowance.

Upon completion of the Professional Officer Course and graduation from the University, students are commissioned as Second Lieutenants in the United States Air Force. All instructors are active duty officers assigned
Military Science

The Army ROTC program at Texas A&M is the oldest on campus. Aggie ROTC graduates are renowned throughout the Army and business world for their leadership abilities, initiative, and competence.

AROTC graduates are proud to contribute to the heritage of the “Fightin’ Texas Aggies.” Army ROTC members are leaders in a wide variety of university activities including Student Government, campus athletics, the Fightin’ Texas Aggie Band Ross Volunteer Company, Rudder’s Rangers and Parsons Mounted Calvary. The Army ROTC Ranger Challenge Team is a perennial contender at both the Regional and National levels having finished in the top five at the Sandhurst competition hosted by the US Military Academy in consecutive years. The Ranger Challenge Team works closely with the Corps-sponsored Aggie Pathfinder orienteering team to develop expert land navigation skills and the stamina to compete in physically challenging terrain.

The Army has the career field to match a student’s education and interests, with no restrictions on the major field of study or discipline. Army ROTC classes are unique in the college curriculum in offering both classroom instruction and hands-on leadership development opportunities. The Army ROTC student may enter such diverse career fields as aviation, engineering, law enforcement, medical services, armor, infantry, artillery, communications, finance, personnel administration, transportation, or military intelligence. Engineering students are eligible to participate in the University’s chapter of the Society of American Military Engineers. Opportunities in Airborne, Ranger and Special Operations are also available. Highly qualified applicants may compete to take part in the delayed entry program while pursuing medical or law degrees and selected cadets may attend specialty military training including Airborne, Air Assault, Northern Warfare, and Mountain Warfare Schools.

Army ROTC is divided into two parts: The Basic and Advanced Courses. The Basic Course is taken in the freshman and sophomore years. Coursework covers the areas of military courtesy, discipline, and customs as well as map reading, marksmanship and land navigation. Students begin leadership development opportunities as members of the Warrior Training Battalion participating in weekly tactical leadership labs and field training exercises. Uniforms and the necessary textbooks are furnished and there is no military commitment for participation in the Basic Course. Three and Four year ROTC scholarship winners attend Cadet Initial entry training in the summer after their Freshman or Sophomore years.

The Advanced Course is taken in the final two years of college and includes the Cadet Leader Course (CLC) during the summer after the junior or senior year. Instruction includes advanced leadership development, organization ethics critical thinking and problem solving, administration, and military law. Summer training at Fort Knox, Kentucky enables cadets to put into practice, in a field environment, the principles and theories acquired in the classroom. All cadets in the Advanced ROTC program and who have entered into a commissioning contract receive a tiered subsistence allowance up to $500 per month and are paid approximately $800 for attending CLC. Army ROTC cadets are encouraged to take courses in strategic languages. Through the Army’s Culture and Language Incentives Program, students can earn up to $300 per credit hour for completing classes in qualifying languages. In addition, AROTC sponsors the Cultural Understanding and Language Proficiency Program that affords students the opportunity to participate in month long immersion programs in over 40 countries.

Army ROTC cadets receiving commissions may request to serve on active duty with the U.S. Army following graduation or to pursue a civilian career upon completion of the officer’s basic schooling while remaining affiliated with the Army Reserve or National Guard.

The Army ROTC Scholarship program awards four-year and three-year advance designee scholarships on a competitive basis to students entering ROTC as college freshmen. Two-year and three-year scholarships also are available for college students already enrolled in ROTC. These scholarships pay the cost of tuition, required fees and a flat rate textbook allowance for the duration of the award and provide a tiered subsistence allowance of up to $500 per month. In all, a four-year scholarship can be worth over $58,000 at Texas A&M. Additional scholarship opportunities are available specifically for students participating in Science, Technology, Engineering, and Math majors that pay the same benefits as four and three-year ROTC scholarships.

Qualified students who join the Army National Guard or Army Reserve, may participate in the Simultaneous Membership Program (SMP) in which they earn approximately $250 per month. The total dollar amount for SMP cadets can reach $750 per month during their junior and senior years in ROTC. Tuition assistance, which pays between 75-100% of tuition costs, is available through the US Army Reserves and Texas National Guard.

Qualified veterans may enroll directly into the ROTC Advanced Course. Veterans in the Advanced Program receive a tiered subsistence allowance of up to $500 per month in addition to their veterans’ benefits. The U.S. Army Health Profession Scholarship Program offers a unique opportunity for financial support to cadets who desire to continue their education beyond their undergraduate work by enrolling in a program leading to a professional degree in medicine, dentistry or veterinary medicine.

Texas A&M’s staff, having served multiple combat and operational deployments overseas, are dedicated to developing academically superior and physically fit commissioned officers recognized as outstanding leaders of character for the U.S. Army Officer Corps. For more information on Army ROTC programs, contact the Military Science Department at (979) 845-2814.

Naval Science

Mission

The Naval ROTC Unit at Texas A&M University provides qualified young men and women the opportunity to learn the mission of the Naval Services and pursue a commission as an officer in the United States Navy or United States Marine Corps. The Naval ROTC Unit operates as the Department of Naval Science at Texas A&M and is one of the largest Naval ROTC Units in the United States. Graduates from our program can be found serving around the world. Officers commissioned as Ensigns in the United States Navy have the option, based on physical and aptitude qualification, to serve in the Aviation (Pilot or Naval Flight Officer), Surface Warfare (Conventional or Nuclear), Nuclear Submarine, or Special Warfare (SEAL or Explosive Ordnance Disposal) communities. Officers commissioned as Second Lieutenants in the United States Marine Corps can serve in one of more than 36 military operational specialties in three categories including Aviation (Pilot or Naval Flight Officer), Combat Arms...
Texas A&M University Undergraduate Catalog

Academic requirements vary by program, but all freshmen and sophomore Naval ROTC students must take a Naval Science (NVSC) class each Fall and Spring semester. These courses provide a basic understanding of the Navy and Marine Corps organization and mission; address the concepts of leadership, ethics, and management; and provide a basic understanding of the history of American sea power and the evolution of warfare throughout the ages. All Scholarship and College Program (Advanced Standing) students continue to take Naval Science courses during their junior and senior year. These courses cover additional topics such as navigation, weapons systems, amphibious warfare and leadership and ethics for the junior officer.

Summer Cruise

Scholarship students receive four to six weeks of additional training every summer with operational Navy and Marine Corps units around the world. Between the freshman and sophomore years, students receive orientation training with naval aviation, surface combatant, submarine and Marine Corps units. Between the sophomore and junior years, Navy Option students experience the life of enlisted sailors aboard ships and submarines and Marine Option students experience the life of enlisted marines with Marine units in the field. For the final training session between the junior and senior years, all Scholarship and College Program (Advanced Standing) students receive service-specific training in final preparation for commissioning. Navy Option students are assigned to aviation units, surface combatants or submarines depending upon their qualifications and desires and receive hands-on training working closely with qualified junior officers. Marine Option students attend Officer Candidate School at Quantico, VA where they are screened, trained and evaluated in an intense, competitive environment alongside other Marine Option students from around the country. Students participating in summer cruises are provided government travel, medical and dental care, commissary and exchange privileges, and are paid for the duration of the training.

Commissioning

Upon graduation, qualified Naval ROTC Navy and Marine Option Scholarship students receive commissions as Ensigns in the United States Navy or as Second Lieutenants in the United States Marine Corps and serve a minimum of four years of active duty. Qualified Naval ROTC College Program (Advanced Standing) Navy Option students receive commissions as Ensigns in the United States Navy and serve a minimum of three years of active duty. Qualified Naval ROTC College Program (Advanced Standing) Marine Option students receive commissions as Second Lieutenants in the United States Marine Corps and serve a minimum of three and a half years of active duty. Those Navy Option graduates who are academically qualified and accepted to graduate school in certain disciplines may apply for active duty deferments to complete their post-graduate education.

NROTC Staff

The staff of the Naval Science Department is dedicated to producing officers of the highest quality for the United States Navy and United States Marine Corps. All instructors are active duty Navy or Marine Corps officers and senior enlisted personnel assigned to the University by the United States Navy or United States Marine Corps. In addition, they work with the Corps of Cadets and act as military advisors to the Companies/Outfits within the Naval regiments. This group of highly trained professionals places specific emphasis on the academic and professional development of every student assigned. Additional information about the Naval ROTC program at Texas A&M University can be obtained by calling the Department at (979) 845-1775, or by visiting the Texas A&M Naval ROTC (http://nrotc.tamu.edu) website.
Military Studies - Minor

The School of Military Sciences offers a minor in Military Studies. This minor is available to all Texas A&M students but is not required for ROTC or Corps of Cadets participation. Students should consult with an advisor in their major department to determine minor requirements. All students desiring to enroll in the Military Studies minor should contact the Assistant Commandant for Academics and International Programs in Room 211 of the Buzbee Leadership Learning Center, (979) 458-2829.

Program Requirements

The Military Studies minor requires 18 hours. Nine hours must be completed in approved upper-level Aerospace Studies, Military Science, or Naval Science courses with an additional 9 hours from approved university courses with a military-related focus. A minimum of 12 hours must be at the 300-400 level. A grade of C or higher is required if a course is to be counted towards the minor field. Minor programs are recognized on the transcripts after graduation, but not on the diploma. The student's college and/or major department determines the number of minor programs a student may seek and shall be responsible for advising after the student receives signed approval from the Assistant Commandant for Administration.

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<tr>
<th>Code</th>
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<th>Semester Credit Hours</th>
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<tr>
<td>NVSC 303</td>
<td>Evolution of Warfare</td>
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<td>NVSC 401</td>
<td>Naval Ships Systems II: Weapons</td>
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<td>NVSC 402</td>
<td>Leadership and Ethics</td>
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<td>NVSC 410</td>
<td>Amphibious Warfare</td>
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<td>AERS 303</td>
<td>Air Force Leadership Studies</td>
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<td>AERS 304</td>
<td>Air Force Leadership Studies</td>
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<td>AERS 403</td>
<td>National Security Affairs—Preparation for Active Duty</td>
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<td>MLSC 321</td>
<td>Adaptive Leadership and Tactical Operations I</td>
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<td>Adaptive Leadership and Tactical Operations II</td>
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<td>MLSC 421</td>
<td>The Army Officer and the Profession of Arms I</td>
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<td>MLSC 422</td>
<td>The Army Officer and the Profession of Arms II</td>
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<td>The Middle East</td>
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<tr>
<td>GEOG 327</td>
<td>Geography of South Asia</td>
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<td>GNSS in the Geosciences</td>
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<td>GEOG 361</td>
<td>Remote Sensing in Geosciences</td>
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<td>GEOG 390</td>
<td>Principles of Geographic Information Systems</td>
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<td>Political Geography</td>
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<td>Geography of Terrorism</td>
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<td>GEOG 475</td>
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<td>HIST 232</td>
<td>History of American Sea Power</td>
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<td>HIST 234</td>
<td>European Military History</td>
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<td>HIST 337</td>
<td>War and European Society in the Twentieth Century</td>
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<td>HIST 348</td>
<td>Modern Middle East</td>
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<td>HIST 349/</td>
<td>The Vietnam War/The American War</td>
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<tr>
<td>ASIA 349</td>
<td>War</td>
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<td>World War II in Asia and the Pacific</td>
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<td>ASIA 350</td>
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<td>HIST 353</td>
<td>Modern South Asia</td>
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<td>HIST 355/</td>
<td>Modern China</td>
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<td>ASIA 355</td>
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<td>HIST 357/</td>
<td>Out of Africa: The Black Diaspora and the Modern World</td>
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<td>AFST 357</td>
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<td>America in the Gilded Age, 1877-1901</td>
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<td>Reform, War and Normalcy: The United States, 1901-1929</td>
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<td>HIST 373</td>
<td>The Great Depression and World War II</td>
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<td>HIST 403</td>
<td>History of Nazi Germany</td>
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<td>HIST 405</td>
<td>History of the Holocaust</td>
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<td>HIST 406</td>
<td>The Era of the French Revolution and Napoleon, 1715-1815</td>
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<td>HIST 412</td>
<td>Soviet Union 1917-1991</td>
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<td>HIST 443</td>
<td>American Military History to 1901</td>
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<td>HIST 444</td>
<td>American Military History Since 1901</td>
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<tr>
<td>PHIL 315</td>
<td>Military Ethics</td>
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<tr>
<td>PHIL 331/</td>
<td>Philosophy of Religion</td>
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<td>RELS 331</td>
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<td>PHIL 332</td>
<td>Social and Political Philosophy</td>
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<td>PHIL 381</td>
<td>Ethical Theory</td>
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<td>POLS 312</td>
<td>Ethnic Conflict</td>
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<td>POLS 326</td>
<td>Government and Politics of Eastern Europe</td>
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<td>Globalization and Democracy</td>
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<td>POLS 333</td>
<td>International Cooperation</td>
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<td>POLS 335</td>
<td>International Conflict</td>
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<tr>
<td>POLS 338</td>
<td>Government and Politics of the Former Soviet Union</td>
<td>1</td>
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<td>POLS 368</td>
<td>Latin American Legislatures</td>
<td>1</td>
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<tr>
<td>POLS 413</td>
<td>American Foreign Policy</td>
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<td>POLS 415</td>
<td>Contemporary Issues in American Foreign Policy</td>
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<tr>
<td>POLS 429</td>
<td>Issues in World Politics</td>
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Leadership Study and Development - Certificate

The School of Military Science offers a certificate in Leadership Study and Development.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tr>
<td>SOMS 380</td>
<td>Workshop in Leadership Education</td>
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<tr>
<td>SOMS 481</td>
<td>Seminar in Executive Leadership</td>
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<td>ALED 340</td>
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<td>ALED 341</td>
<td>Team Learning</td>
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<td>ALED 342</td>
<td>Learning Organizations</td>
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<td>ALED 400</td>
<td>Public Leadership Development</td>
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<td>BUSN 125</td>
<td>Business Learning Community I</td>
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<td>BUSN 401</td>
<td>Mays Business Fellows I</td>
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<tr>
<td>COMM 210</td>
<td>Group Communication and Discussion</td>
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<tr>
<td>ENGR 482/PHIL 482</td>
<td>Ethics and Engineering</td>
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<tr>
<td>HIST 403</td>
<td>History of Nazi Germany</td>
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<td>IBUS 452/MGMT 452</td>
<td>International Management</td>
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<tr>
<td>IDIS 434</td>
<td>The Quality Process in Distribution</td>
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<td>IDIS 444</td>
<td>Ethics and Leadership in Distribution</td>
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<tr>
<td>KINE 431</td>
<td>Ropes Course and Group Process</td>
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<tr>
<td>MGMT 363</td>
<td>Managing People in Organizations</td>
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<tr>
<td>MGMT 372</td>
<td>Advanced Concepts in Organizational Behavior</td>
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<td>MGMT 475</td>
<td>Leadership Development</td>
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<tr>
<td>MMET 429</td>
<td>Managing People and Projects in a Technological Society</td>
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<td>PHIL 111</td>
<td>Contemporary Moral Issues</td>
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<td>PHIL 315</td>
<td>Military Ethics</td>
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<td>SOMS 380</td>
<td>Workshop in Leadership Education</td>
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<tr>
<td>SOMS 481</td>
<td>Seminar in Executive Leadership</td>
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1 Minimum of 6 hours of School of Military Sciences courses (NVSC, AERS, and MLSC) must be at the 400 level.
TEXAS A&M UNIVERSITY
GALVESTON CAMPUS

General Statement
Texas A&M University Galveston campus, a branch campus of Texas A&M University, offers ocean-oriented academic degrees, research, continuing education and public service in marine science, engineering, business, transportation and liberal arts. Degrees are awarded from Texas A&M University. Ocean voyages, sailing in Galveston Bay, beachfront experiments and independent study complement the rigorous classroom experience at Texas A&M University Galveston campus. In addition to its academic programs, the campus houses the Texas A&M Maritime Academy, which offers training programs leading to officer licensing in the U.S. Merchant Marine.

Texas A&M University Galveston campus is located near the mouth of Galveston Bay with close access to the Gulf of Mexico. Most instructional programs are taught at the 130-acre Mitchell Campus on Pelican Island (with housing for 1,400+ students). The training ship serves as a floating classroom, laboratory and dormitory for the annual summer training cruise of the U.S. Maritime Service cadets. During the regular school year, the ship is berthed at Pelican Island and provides valuable dockside laboratory facilities for instruction in the practical aspects of the maritime curricula.

University Statement on Harassment and Discrimination
Texas A&M University Galveston campus is committed to providing an educational and work climate that is conducive to the personal and professional development of each individual. To fulfill its multiple missions as an institution of higher learning, Texas A&M encourages a climate that values and nurtures collegiality, diversity, pluralism and the uniqueness of the individual within our State, nation and world. The University also strives to protect the rights and privileges, and to enhance the self-esteem of all its members. Faculty, staff and students should be aware that any form of harassment and any form of illegal discrimination against any individual is inconsistent with the values and ideals of the University community. Any questions or complaints relative to discrimination should be referred to the Human Resources Office.

Courses of Study
Texas A&M University Galveston campus provides undergraduate degree programs in Marine Biology (MARB), Marine Sciences (MARS), Marine Engineering Technology (MARR), Marine Transportation (MART), Marine Fisheries (MARF), Maritime Administration (MARA), Maritime Studies (MAST), Ocean and Coastal Resources (OCRE) and University Studies (USGA) (with concentrations in Oceans and One (MART), Marine Fisheries (MARF), Maritime Administration (MARA), Communication, and Tourism and Coastal Community Development).

A 5-year program is offered to allow OCRE majors to additionally complete the Master of Marine Resource Management (MARM) degree, combining their senior year of OCRE with the first year of MARM. A similar 5-year program is offered to allow MARA majors to complete the Master of Maritime Administration and Logistics (MMAL) degree program in a total of 5 years. All students complete the University Core Curriculum requirements set by Texas A&M University to ensure a broad-based education.

Texas A&M University Galveston campus offers a M.S. (thesis or non-thesis) and Ph.D. in Marine Biology, both a thesis and non-thesis Master of Marine Resource Management degree and a thesis and non-thesis Master of Maritime Administration and Logistics degree. The Texas A&M Maritime Academy is headquartered on the Galveston campus.

Texas A&M University Galveston campus is fully accredited by the “Southern Association of Colleges and Schools Commission on Colleges”. Marine Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET and is STCW certified by the U.S. Coast Guard.

Admission
Admission into Texas A&M University Galveston campus is processed separately, and requires a separate application, from Texas A&M University at College Station. Applicants must apply for any program on the Galveston campus via www.applytexas.org (https://www.applytexas.org). The SAT or the ACT admission examinations are acceptable. Students should have the scores forwarded to Texas A&M University Galveston campus (Code 6835 for SAT and Code 6592 for ACT).

To obtain an enrollment packet or schedule a campus visit, call toll free at 1-877-SEAAGGIE, write Office of Admissions, Texas A&M University Galveston Campus, P. O. Box 1675, Galveston, TX 77553-1675, or visit www.tamug.edu (http://www.tamug.edu/admissions)/admissions. Acceptance by the Office of Admissions does not constitute admission to the U.S. Maritime Service License Option Program. When admission requirements have been satisfied, the Office of Enrollment Services will send the applicant a letter of acceptance.

Admission Statement and Policy on Individuals with Disabling Conditions
Texas A&M University Galveston campus has a strong institutional commitment to the principle of diversity in all areas. In that spirit, admission to Texas A&M University and any of its sponsored programs is open to all qualified individuals. Texas A&M does not discriminate on the basis of an individual’s disability and complies with Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act (ADA) as amended in its admissions, accessibility, treatment and employment of students in its programs and activities. Services and facilities are available to students with handicaps. Individuals should contact the Office of Student Affairs if they have special needs before they commit to enrollment.

U.S. Maritime Service Corps of Cadets
Texas A&M University Galveston campus houses the Texas A&M Maritime Academy, which is one of six state maritime academies in the U.S. preparing graduates for licensing as officers in the American Merchant Marine. This program provides an opportunity for students to learn how to operate and maintain an ocean-going vessel. In addition to classroom and field training during the regular school year, students will sail aboard a training vessel during three summer cruises to gain practical experience in seamanship, navigation and operations. At the conclusion of the program, cadets are tested to become licensed as officers in the U.S. Merchant Marine and may seek employment in the exciting field of marine transportation as a licensed Third Mate or Third Assistant Engineer.

The NROTC Program offers men and women an opportunity to qualify for a commission in the Navy while attending Texas A&M University
Galveston campus. All NROTC students are required to participate in the Texas A&M Maritime Academy Corps of Cadets. Any student may join the NROTC Program either as a National Scholarship winner or as a non-subsidized college program student. Applications for National Scholarships can be obtained through a Navy recruiting office before the submission deadline of January 30 of the year for which the student is applying.

**Mission Statement**

Texas A&M University Galveston campus is a special-purpose institution of higher education for undergraduate and graduate instruction in marine and maritime studies in science, engineering and business and for research and public service related to the general field of marine resources. The institution is under the management and control of the Board of Regents of The Texas A&M University System, with degrees offered under the name and authority of Texas A&M University at College Station.

**Research Programs**

Faculty, post-doctoral fellows, research staff and students are actively involved in research throughout the world. Research is conducted under the direction of more than 50 faculty members with funding from federal, state, private and university sources including the National Science Foundation, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration, Department of the Interior, National Institutes of Health, Department of Energy, Environmental Protection Agency, Texas General Land Office, Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, CONACYT, Consortium for Ocean Leadership, Texas Institute of Oceanography and Research Development Fund. Externally funded research expenditures were over $4.1 million. Total research expenditures were over $5.6 million. Research encompasses both the basic and applied aspects of fields such as marine biology, oceanography, coastal/ocean engineering, marine geology, marine policy and management, environmental studies, conservation, business, admiralty law and coastal zone management. Research is focused largely in the areas of coastal and beach processes (e.g., physical profiling of coastal regions and erosion processes and control), marine life studies (e.g., marine mammal, fish, shellfish, algae and sea turtle biology and ecology), bay and estuary ecosystems (e.g., wetlands management and toxic contaminant analysis), geochemical cycling in marine/aquatic/atmospheric systems and offshore/deep water environments. There are over 130 students participating in these programs. Many of the faculty researchers also have graduate appointments in TAMUG and/or TAMU departments. Approximately 40 M.S. and Ph.D. graduate students from the TAMU departments of Wildlife and Fisheries Sciences, Oceanography, Ecosystem Science and Management, Ocean/Civil Engineering, Biology and Anthropology are conducting their research under a Texas A&M University Galveston campus faculty member. Undergraduate students have many opportunities to participate in research, such as the Texas Institute of Oceanography Undergraduate Student Research Program, working as student workers and technicians on funded research programs, taking independent study classes or participating in the Undergraduate Research Scholars Program. Undergraduate students may work in the laboratory and at field sites throughout the world, participate in research cruises, present results at local, national and international meetings, and serve as authors on publications.

**Administrative Officers**

Col. Michael E. Fossum, USAFR (Ret.) - Chief Operations Officer, Texas A&M University Galveston Campus; Vice President, Texas A&M University

Dr. Patrick Loucoucharn - Executive Associate Vice President for Academic Affairs and Chief Academic Officer, Texas A&M University Galveston Campus; Associate Provost, Texas A&M University

RADM Michael J. Rodriguez, USMS - Superintendent, Texas A&M Maritime Academy

Dr. Donna C. Lang - Associate Vice President for Academic Operations

Ms. Susan Hernandez Lee - Associate Vice President for Finance and Compliance Officer

Mr. Grant W. Shallenberger - Associate Vice President for Administration and Auxiliary Services

Dr. Antonietta S. Quigg - Associate Vice President for Research and Graduate Studies

Dr. Todd Sutherland - Assistant Vice President for Student Affairs

**Board of Visitors**

Dennis E. Murphree (Chairman)
Robert A. Fry, Jr. (Vice Chairman)
Wade Battles
Greg Binion
Kyle Buese
Christopher S. Cahill
Michael E. Cokinos
Robb Erickson
Thomas E. Farmer
G. Allen Flynt
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Billy Greer
Roger Guenther
Paul Hill
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Charlie Jenkins
William E. Jenkins
Mark Lyons
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Betty Massey
Keith W. McFartridge, Jr.
James P. McGregor
John J. Michael
Phyllis Milstein
B. Greg Mitchell
Robert Mitchell
Jerry Mohn
Frank M. Muller, Jr.
L.C. Neely
Brandon Hal Neff
Bruce Nichols
Chris Orth
Victor R. Pierson
Wayne H. Prescott
Terry Ray
Classrooms, laboratories and meeting spaces are housed within 18 major buildings on the Mitchell Campus on Pelican Island. The Ocean and Coastal Studies building is the largest and best-equipped marine research facility on the Gulf of Mexico. There are seven residence halls on campus, the James McCloy Arena and the Mary Moody Northen Student Center with cafeteria services. The Jack K. Williams Library contains over 43,000 books, 35,000 bound volumes of journals and a collection of charts and maps. The training ship provides additional classroom, meeting and training space during the school year, and an additional fleet of small boats serve as floating classrooms and research stations. Texas A&M University Galveston campus has telecommunications systems established to communicate statewide within The Texas A&M University System universities and agencies. The Galveston campus has direct access to the Texas A&M University computer network in College Station via remote job entry connect lines.

Housing applications are available from Texas A&M University Galveston campus and should be returned with the required deposit to the Office of Student Services, Texas A&M University Galveston Campus, P.O. Box 1675, Galveston, TX 77553-1675.

Department of Liberal Studies

The Department of Liberal Studies at Texas A&M Galveston campus offers four unique interdisciplinary undergraduate degrees:

1) A Bachelor of Arts degree in Maritime Studies
2) A Bachelor of Science University Studies degree in Maritime Public Policy and Communication
3) A Bachelor of Science University Studies degree in Tourism and Coastal Community Development
4) A Bachelor of Science University Studies degree in Marine Environmental Law and Policy

The mission of the Department of Liberal Studies is to provide a robust intellectual foundation for students pursuing occupational and leadership roles in areas such as government, communication, business, non-governmental organizations, public policy, tourism policy, journalism and public relations, archeology and anthropology, museums and archives, professional diving, and preparation for graduate studies and law school.

Liberal Studies students participate in a variety of national programs such as the Model United Nations, and international educational opportunities around the world are frequently available through courses offered in the Texas A&M University Study Abroad Programs Office (http://studyabroad.tamu.edu).

With faculty maintaining research agendas in a variety of disciplines including politics, history, mass media and communication, English, popular culture, archeology, philosophy, museum studies, anthropology, genocide studies, African-American studies, and mathematics, Liberal Studies builds within students enhanced critical thinking and strong communication skills, while emphasizing the critical nature of multicultural thinking and collaboration in a global economy.
The Department of Liberal Studies provides the skills necessary for students to:

- Lead others through critical thinking, multi-dimensional problem solving, and issue advocacy;
- Be competitive in a multicultural world increasingly interested in college graduates with interdisciplinary backgrounds;
- Inform public policy creation and decision-making from both the governmental and business perspectives;
- Earn internships in areas such as politics, law and legal affairs, communication, for-profit and non-profit organizations, and museum management;
- Prepare for graduate school and law school opportunities;
- Understand the inalienable connections between liberal education, freedom, and democracy.

**Faculty**

Acero-Schertz, Carmen E, Lecturer  
Liberal Studies  
PHD, University of Miami, 1996

Blomstedt, Larry W, Lecturer  
Liberal Studies  
PHD, Texas A&M University, 2008

Bosquez, Joseph J, Visiting Lecturer  
Liberal Studies  
BS, Texas A&M University, 2011  
CERT, National Association of Underwater Instructors, 2011

Brooks, Stuart R, Lecturer  
Liberal Studies  
MA, University of Houston Clear Lake, 2009

Brown, Philip R, Associate Professor  
Liberal Studies  
PHD, Texas A&M University, 2000

Capper, David W, Instructional Assistant Professor  
Liberal Studies  
PHD, Baylor University, 2013

Cole, Collier M, Lecturer  
Liberal Studies  
PHD, University of Houston, 1976

Coleman, Cheryl L, Lecturer  
Liberal Studies  
JD, Northwestern University School of Law, 1993

Curley, Stephen J, Professor  
Liberal Studies  
PHD, Rice University, 1974

Davis, Carol, Associate Professor  
Liberal Studies  
PHD, University of Southern California, 2007

DiGeorgio-Lutz, JoAnn, Professor  
Liberal Studies  
PHD, University of North Texas, 1993

DiMarco, Frank P, Lecturer  
Liberal Studies  
MS, Long Island University, 1981

Domsky, Darren K, Associate Professor  
Liberal Studies  
PHD, York University, 2006

Echols, Katherine E, Instructional Assistant Professor  
Liberal Studies  
PHD, University of Houston, 2015

Euresti, Vianne R, Lecturer  
Liberal Studies  
CERT, National Association of Underwater Instructors, 2014  
BS, Texas A&M University, 2013

Furth, Brett H, Lecturer  
Liberal Studies  
PHD, Texas A&M University, 2015

Galvan Mandujano, Martha C, Lecturer  
Liberal Studies  
PHD, The University of Oklahoma, 2015

Garza-Horne, Julie A, Lecturer  
Liberal Studies  
MA, University of Houston Clear Lake, 2010

Goodson, Joshua E, Instructional Assistant Professor  
Liberal Studies  
PHD, Texas State University, 2012

Gracia, Pete A, Senior Lecturer  
Liberal Studies  
MS, University of Houston - Clear Lake, 1991

Haney, Adam D, Lecturer  
Liberal Studies  
MA, Texas A&M University Commerce, 2014

Hendon, Edmund L, Lecturer  
Liberal Studies  
MA, Texas Southern University, 2015

Hufton, Amie J, Instructional Associate Professor  
Liberal Studies  
MMR, Texas A&M University, 2010  
CERT, National Association of Underwater Instructors, 2006

Johnson, Thomas S, Associate Professor Emeritus  
Liberal Studies  
PHD, The University of Texas at Austin, 1973

Josvoll, Kristin K, Lecturer  
Liberal Studies  
MA, Johns Hopkins University, 2015

Kang, Cong X, Associate Professor  
Liberal Studies  
PHD, The University of Texas at Austin, 1999
Lawhon, David R, Instructional Associate Professor
Liberal Studies
MA, University of Houston at Clear Lake, 2000

Luxemburg, Leon A, Associate Professor
Liberal Studies
PHD, Texas A&M University, 1987

Maceo, Debra A, Instructional Professor
Liberal Studies
MS, University of Houston, 1995

Mark, Samuel E, Professor
Liberal Studies
PHD, Texas A&M University, 2000

McCloud, Daisey, Lecturer
Liberal Studies
PHD, Walden University, 2005

Noack, Laurissa, Lecturer
Liberal Studies
MMRM, Texas A&M University, 2008

Nyman, Elizabeth A, Assistant Professor
Liberal Studies
PHD, Florida State University, 2010

Oertling, Thomas J, Instructional Assistant Professor
Liberal Studies
MS, Texas A&M University, 1984

Pangemanan, Adelaide P, Instructional Assistant Professor
Liberal Studies
MS, State University of New York at Stony Brook, 2002

Pearl, Frederic B, Associate Professor
Liberal Studies
PHD, Texas A&M University, 2001

Presswood, Phillip H, Lecturer
Liberal Studies
MS, University of Houston at Clear Lake, 2011

Qiu, Lin, Instructional Assistant Professor
Liberal Studies
PHD, The University of Alabama, 2006

Ryan, James G, Professor
Liberal Studies
PHD, University of Notre Dame, 1981

Slatton, Katie J, Instructional Assistant Professor
Liberal Studies
MED, University of Montevallo, 2003

Suen, Ching-Yun, Professor
Liberal Studies
PHD, University of Houston, 1983

Szucs, Joseph, Professor Emeritus
Liberal Studies
PHD, Szeged University in Hungary, 1967

Theis, William D, Lecturer
Liberal Studies
MA, University of Houston, 1988

Traber, Daniel S, Associate Professor
Liberal Studies
PHD, University of Houston, 2000

Udoetuk, Mayen, Lecturer
Liberal Studies
BS, Norfolk State University, 2006

Viser, Victor J, Instructional Assistant Professor
Liberal Studies
PHD, Temple University, 1995

Willett, Donald E, Professor
Liberal Studies
PHD, Texas A&M University, 1985

Williams, Sara S, Lecturer
Liberal Studies
CERT, National Association of Underwater Instructors, 2004
BS, Texas A&M University, 2000

Wood, Gregory M, Lecturer
Liberal Studies
BS, Texas A&M University, 2003

Yi, Eunjeong, Professor
Liberal Studies
PHD, University of Houston, 2003

Majors

• Bachelor of Arts in Maritime Studies (p. 666)
• Bachelor of Science in University Studies, Marine Environmental Law and Policy Concentration (p. 667)
• Bachelor of Science in University Studies, Maritime Public Policy and Communication Concentration (p. 668)
• Bachelor of Science in University Studies, Tourism and Coastal Community Development Concentration (p. 669)

Minors

• Diving Technology and Methods Minor (p. 669)
• Maritime Studies Minor (p. 670)

Maritime Studies - BA

Maritime Studies: Freedom Starts with the Liberal Arts

Maritime Studies (MAST), the only Bachelor of Arts offered on the Galveston campus, offers students a unique opportunity to examine the varied ways that humans use and impact coastal and maritime environments.
By studying the history, archaeology, literature, communication and politics of maritime peoples and cultures from ancient times to present, MAST majors gain a comprehensive understanding of maritime cultural adaptations and mankind’s experience with the sea. The broad-based interdisciplinary nature of this exciting liberal arts program gives it a distinctive, international emphasis.

Working closely with their advisor, students will tailor their MAST degree to suit their interests, and have many opportunities for enrichment activities contributing to a healthy graduation portfolio. These activities can include enrollment in an internship suited to their career interest, participation in field studies, concentration on a particular topic with a professor of their choice, and/or studying abroad for a semester. Additionally, MAST students are given the once-in-a-lifetime opportunity to train as a crew member on a working 19th century tall ship, while earning college credit. Students are encouraged to pursue at least one minor, usually in Anthropology, English, Diving, Museum Studies or History, and many earn two.

Employers understand that students of the liberal arts bring advanced comprehensive problem-solving capabilities to the job market. By the time they graduate, our students will have acquired valuable critical thinking, reasoning, and communication skills. They are prepared for a diverse choice of fields including, but not limited to, oil and gas administration, environmental management, state and federal agencies, historical and non-profit foundations, museums conservation and administration, mass and niche communication, nautical and contract archaeology, journalism, education, management, law school, and graduate studies in related fields.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
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<tr>
<td></td>
<td><strong>MARITIME STUDIES REQUIREMENTS</strong></td>
<td></td>
</tr>
<tr>
<td>ANTH 210</td>
<td>Social and Cultural Anthropology ¹</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 316</td>
<td>Nautical Archaeology ¹</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 335</td>
<td>Literature of the Sea ¹</td>
<td>3</td>
</tr>
<tr>
<td>HIST 242</td>
<td>United States Maritime History ¹</td>
<td>3</td>
</tr>
<tr>
<td>MAST 411</td>
<td>International Maritime Culture ¹</td>
<td>3</td>
</tr>
<tr>
<td>MAST 425</td>
<td>Thesis and Technical Writing ¹</td>
<td>3</td>
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<td>MAST 441</td>
<td>Maritime Piracy ¹</td>
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<td>MAST Electives ¹,²</td>
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<td>Directed Electives ¹,³</td>
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<tr>
<td>General Electives</td>
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<td></td>
<td><strong>UNIVERSITY AND COLLEGE REQUIREMENTS</strong></td>
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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
<td>3</td>
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<tr>
<td>ANTH 225</td>
<td>Introduction to Biological Anthropology</td>
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<tr>
<td>ANTH 226</td>
<td>Introduction to Biological Anthropology Laboratory</td>
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<tr>
<td>HIST 232</td>
<td>History of American Sea Power</td>
<td>3</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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<tr>
<td>Mathematics (p. 22)</td>
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<tr>
<td>Life and physical sciences (p. 22)</td>
<td></td>
<td>5</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td></td>
<td>3</td>
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</tbody>
</table>

¹ Must make a grade of "C" or higher
² Select from: ANTH 318, ANTH 330, ANTH 351, ANTH 484; CLAS 371; ENGL 415; MAST 200-499 (p. 883) (except MAST 480, MAST 481); PHIL 314; POLS 231, POLS 347. A maximum combination of 6 hours of 484, 485 and/or 491 may be used as MAST electives.
³ Select from: ANTH 202, ANTH 313, ANTH 350/ASIA 360, ANTH 409, ANTH 423, ANTH 485, COMM 203, COMM 365/JOUR 365; ENGL 330, ENGL 334, ENGL 338, ENGL 339/AFST 339, ENGL 374/WGST 374, ENGL 484, ENGL 485; HIST 226, HIST 370, HIST 373, HIST 374, HIST 405, HIST 485; KINE 199; MARA 212, MARA 421, MARA 435, MARA 470; MARB 340, MARB 350, POLS 232, POLS 353, POLS 366; SPAN 101, SPAN 102; SPAN 201, SPAN 202. A maximum of 3 hours of KINE 199, and a maximum of 3 hours of 484 OR 485 may be used for Directed Electives.

**University Studies - BS, Marine Environmental Law and Policy Concentration**

Students who are currently enrolled at Texas A&M University Galveston campus may submit proposals to enroll as University Studies majors. The University Studies degree format was created to provide students the flexibility to combine areas of study within either or both campuses that are of special interest. This flexibility may be attractive to students who have particular career paths or post-baccalaureate degree paths in mind.

All University Studies degree plans require at least 120 hours for completion. A University Studies Degree consists of a concentration of 21-24 hours and two minors of 15-18 hours each. Specific courses may be required for the completion of the hours in the concentrations and minors. Some concentrations and minors contain required courses that have additional prerequisites. One of the two minors must be completed in a college outside of the college that provides the concentration for the student’s degree.

Students must submit a Proposed Course Form that lists the courses for the individual degree plan the student hopes to complete to the University Studies admissions committee. The application includes a required 2-3 page essay in which the student can explain how the degree will help the student meet the desired educational and personal goals. Once it is determined that the Proposed Course Form has been completed with appropriate information, it will be reviewed by the department that offers the concentration. Students must be in good academic standing, and they must have good academic standing in previous courses that count toward the area of concentration or minors.

A University Studies major will be considered a student in the department that offers the concentration; the Marine Environmental Law and Policy concentration is housed in the Liberal Studies department. The student’s diploma will list Bachelor of Arts or Bachelor of Science in the same place it is currently listed, and University Studies will be listed in the place the major is currently listed. The student’s area of concentration and the two minors will be indicated on the student’s transcript.
The concentration in Marine Environmental Law and Policy requires 21 to 24 hours in coursework such as business law, admiralty law, environmental law, environmental ethics and politics of energy and the environment. Students can choose from a wide variety of combinations to position themselves for graduate studies in environmental law, employment in environmental regulatory areas and/or industry interested in environmental protection especially in a near shore environment. The student must complete a minimum of 6 hours at the 400-level and 36 hours of 300-400 level coursework in residence at Texas A&M University Galveston campus.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLS 353</td>
<td>Constitutional Rights and Liberties</td>
<td>3</td>
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<tr>
<td>MARA 212</td>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>MARA 421</td>
<td>Admiralty Law</td>
<td>3</td>
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<tr>
<td>MARA 470</td>
<td>Environmental Law</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 314</td>
<td>Environmental Ethics</td>
<td>3</td>
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<tr>
<td>Select from:</td>
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<tr>
<td>POLS 347</td>
<td>Politics of Energy and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>MARA 304</td>
<td>Ocean Transportation II</td>
<td>3</td>
</tr>
<tr>
<td>MARA 363</td>
<td>The Management Process</td>
<td>3</td>
</tr>
<tr>
<td>MARA 435</td>
<td>Labor Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>MARS 491</td>
<td>Research in Marine Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MAST 211</td>
<td>Legal and Social Environment of Business</td>
<td>3</td>
</tr>
<tr>
<td>POLS 232</td>
<td>Introduction to Public Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**University and College Requirements**

- Communication (p. 22): 6
- Mathematics (p. 22): 6
- Life and physical sciences (p. 22): 9
- Language, philosophy and culture (p. 23): 3
- Creative arts (p. 24): 3
- Social and behavioral sciences (p. 25): 3
- American history (p. 25): 6
- POLS 206 | American National Government            | 3                     |
- POLS 207 | State and Local Government               | 3                     |
- Minor 1: 15-18
- Minor 2: 15-18
- General electives 1: 21-24

Total Semester Credit Hours: 120

1 Hours must be in 100-499 courses not used elsewhere.

The study of maritime public policy/policymaking with the study of international and intercultural communication methods, laws and regulations, and activism. MPPC students will focus their plan of study within the Texas A&M University Galveston campus Department of Liberal Studies (LIST), taking significant LIST coursework in public policy, political science, and communication. In addition, with a course selection pool that includes relevant curricula found in Maritime Administration and Marine Sciences, MPPC students engage a synergistic and broad interdisciplinary combination of study that is non-existent in any other major.

With an interdisciplinary approach to maritime issues in public policy and contemporary institutions and methods of global communication, MPPC is a particularly attractive offering for prospective students wishing to acquire a degree from TAMUG in something other than a STEM area. It provides students of good academic standing with a host of skills important to gaining careers in such areas as government, politics, urban planning, business, NGO’s, policymaking, mass media production and administration, journalism, public relations, teaching, and national security. As part and parcel of the TAMUG Department of Liberal Studies, MPPC is particularly well-suited for preparing students for graduate and law schools.

**Program Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>COMM 307/</td>
<td>Mass Communication, Law, and</td>
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<tr>
<td>JOUR 301</td>
<td>Society</td>
<td></td>
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<tr>
<td>COMM 365/</td>
<td>International Communication</td>
<td>3</td>
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<tr>
<td>JOUR 365</td>
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<td>POLS 232</td>
<td>Introduction to Public Policy</td>
<td>3</td>
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<tr>
<td>POLS 340</td>
<td>Introduction to Public Administration</td>
<td>3</td>
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<tr>
<td>Select from:</td>
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<td>COMM 449</td>
<td>Activism and Communication</td>
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<tr>
<td>PHIL 314</td>
<td>Environmental Ethics</td>
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<tr>
<td>POLS 231</td>
<td>Introduction to World Politics</td>
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<tr>
<td>POLS 347</td>
<td>Politics of Energy and the Environment</td>
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<tr>
<td>MARA 435</td>
<td>Labor Law and Policy</td>
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<tr>
<td>MARA 440</td>
<td>Global Economy and Enterprise Management</td>
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<tr>
<td>MARA 470</td>
<td>Environmental Law</td>
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</tr>
<tr>
<td>MARS 432</td>
<td>Peak Oil, Global Warming and Resource Scarcity</td>
<td></td>
</tr>
<tr>
<td>MAST 336</td>
<td>Maritime Foreign Policy</td>
<td></td>
</tr>
<tr>
<td>MAST 441</td>
<td>Maritime Piracy</td>
<td></td>
</tr>
<tr>
<td>MAST 484</td>
<td>Undergraduate Internship</td>
<td></td>
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</tbody>
</table>

**University and College Requirements**

- COMM 203 | Public Speaking                            | 3                     |
- Communication (p. 22): 3
- Mathematics (p. 22): 6
- Life and physical sciences (p. 22): 9
- Language, philosophy and culture (p. 23): 3
- Creative arts (p. 24): 3
- Social and behavioral sciences (p. 25): 3

The TAMUG University Studies concentration in Maritime Public Policy and Communication (MPPC) links two important fields of professional opportunity – Public Policy and Communication. It uniquely synthesizes
University Studies - BS, Tourism and Coastal Community Development Concentration

Overview

The Department of Liberal Studies offers a University Studies degree with a concentration in Tourism and Coastal Community Development.

The Tourism and Coastal Community Development (TCCD) concentration transforms Texas A&M University Galveston campus students into a new class of professionals with the knowledge and skills to help coastal communities progress, while maintaining sound ecological and environmental practices. Such thinking involves an interdisciplinary approach that engenders creative and critical thinking about such issues as maritime public policy, communication, marine science, sociology, and ecology.

Students selecting the TCCD concentration graduate from Texas A&M University Galveston campus with a Bachelor of Science in University Studies, with the capability to guide industry and community toward a path that is both sustainable and economically beneficial.

The goal of the TCCD concentration is to instill a host of skills important to gaining meaningful careers in the growing fields of tourism and community affairs. TCCD career opportunities include:

- Ecotourism
- Coastal community planning and development
- Environmental policy and legislative affairs
- Sports tourism
- Convention and tourism offices
- Hospitality industry liaison
- Tourism sociological impact researcher
- Ecological economics
- NGOs and international social justice legal centers
- Congressional and legislative assistant
- And, many others

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>RPTS 302</td>
<td>Application of Tourism Principles</td>
<td>3</td>
</tr>
<tr>
<td>RPTS 426</td>
<td>Tourism Impacts</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 205</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 320</td>
<td>Demographic Methods</td>
<td>3</td>
</tr>
<tr>
<td>SOCI 404/RPTS 404</td>
<td>Sociology of the Community</td>
<td>3</td>
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<tr>
<td>Concentration Electives</td>
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<tr>
<td>University and College Requirements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition to the course requirements, students must:

- Complete a medical statement showing no contra-indications to diving or have a recreational scuba diver’s physical examination.
- Maintain a GPA of 2.5.
- Maintain good health and fitness appropriate to the level of diving required. Adverse behaviors that put the diver or other participants at risk such as the use of alcohol or certain medicines may require the diver to be removed from the program.

Diving Technology and Methods - Minor

The minor in Diving Technology and Methods combines practical scuba training with advanced coursework highlighting the scientific and professional applications of diving. Students get hands-on experience conducting scientific diving research and gain certification as Dive Masters and Dive Instructors. Students in any major may establish a minor field of study in Diving Technology and Methods through completing 16 hours from the designated courses. A minimum of 8 hours must be completed at the 300- to 400-level.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINE 199</td>
<td>Required Physical Activity (Conditioning Swimming)</td>
<td>3</td>
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<tr>
<td>KINE 199</td>
<td>Required Physical Activity (Positive Impact Diving)</td>
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<tr>
<td>DIVE 250</td>
<td>SCUBA Diving I</td>
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<tr>
<td>DIVE 251</td>
<td>SCUBA Diving II</td>
<td></td>
</tr>
<tr>
<td>DIVE 330</td>
<td>Rescue Diving</td>
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<tr>
<td>DIVE 331</td>
<td>Alternative Diving Technology</td>
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<tr>
<td>DIVE 357</td>
<td>Dive Leadership – Divemaster</td>
<td></td>
</tr>
<tr>
<td>DIVE 457</td>
<td>Dive Leadership – Instructor</td>
<td>3</td>
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</tbody>
</table>

1 Select from COMM 365/JOUR 365; ECON 202; MARS 280, MARS 423; MAST 425, MAST 484, PHIL 314; POLS 232, POLS 340; RPTS 331, RPTS 340, RPTS 423; SOCI 312, SOCI 328, SOCI 484.
2 Hours must be in 100-499 courses not used elsewhere.
Maritime Studies - Minor

The Maritime Studies minor offers students an exciting interdisciplinary selection of courses to complement and enrich all majors offered at Texas A&M University Galveston campus. The minor requires a total of 15 hours—three hours each of Anthropology, English, and History/Political Science, and 6 hours of electives to be chosen from Maritime Studies courses. The broad range of liberal arts courses offered by this minor provides an opportunity for TAMUG students in other majors to expand their knowledge and experience of maritime topics. The courses in the minor have been carefully selected for content, class size, and instructor to give students an optimum learning experience.

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one from:</td>
<td></td>
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<tr>
<td>ANTH 202</td>
<td>Introduction to Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 210</td>
<td>Social and Cultural Anthropology</td>
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<tr>
<td>ANTH 225</td>
<td>Introduction to Biological Anthropology</td>
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<tr>
<td>ANTH 313</td>
<td>Historical Archaeology</td>
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<tr>
<td>ANTH 316</td>
<td>Nautical Archaeology</td>
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<tr>
<td>ANTH 318</td>
<td>Nautical Archaeology of the Americas</td>
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<td>ANTH 350/ASIA 360</td>
<td>European Archaeology</td>
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<tr>
<td>Select one from:</td>
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<tr>
<td>ENGL 335</td>
<td>Literature of the Sea</td>
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<tr>
<td>ENGL 415</td>
<td>Studies in a Major Author</td>
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<tr>
<td>Select one from:</td>
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<tr>
<td>HIST 232</td>
<td>History of American Sea Power</td>
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<tr>
<td>HIST 242</td>
<td>United States Maritime History</td>
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<tr>
<td>MAST 345</td>
<td>Texas Maritime Culture and History</td>
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<tr>
<td>POLS 347</td>
<td>Politics of Energy and the Environment</td>
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<tr>
<td>Select two from:</td>
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<tr>
<td>ANTH 351</td>
<td>Classical Archaeology</td>
<td></td>
</tr>
<tr>
<td>CLAS 371</td>
<td>In Search of Homer and the Trojan War</td>
<td>6</td>
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<tr>
<td>MAST 265</td>
<td>Elissa Sail Taining</td>
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</tr>
<tr>
<td>MAST 350</td>
<td>A History of Wooden Ship Construction</td>
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</tr>
<tr>
<td>MAST 352</td>
<td>Crafts of the Maritime World</td>
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</tr>
<tr>
<td>MAST 354</td>
<td>Ancient Egyptian Seafaring</td>
<td></td>
</tr>
<tr>
<td>MAST 411</td>
<td>International Maritime Culture</td>
<td></td>
</tr>
<tr>
<td>MAST 441</td>
<td>Maritime Piracy</td>
<td></td>
</tr>
</tbody>
</table>

Minimum of 6 hours at 300-400 level. 

A minimum grade of 'C' must be made in a course for it to count toward the minor.

Department of Marine Biology

The Department of Marine Biology offers undergraduate Bachelor of Science degrees in Marine Biology, Marine Fisheries, and Marine Biology-License Option from Texas A&M University. At the graduate level, the department offers Master of Science and Doctoral degrees in Marine Biology. Teaching and research facilities are located in Galveston, Texas along the shore of Galveston Bay. The semitropical climate provides students and faculty with year-round access to a variety of estuarine, coastal and pelagic marine ecosystems, including salt marshes, oyster reefs, seagrass meadows and coastal sand dunes and beaches. A state-of-the-art Sea Life Facility is available for additional hands-on experiences with marine organisms.

With a low student-to-professor ratio, undergraduate students have extensive opportunities for laboratory and field education and research at national and international locations. International educational opportunities are frequently available through courses offered in Mexico, Greece, Italy, and New Zealand through the TAMU Study Abroad Program, as well as a summer field course in Alaska.

The faculty have research expertise in marine fisheries, marine invertebrate and vertebrate zoology, marine botany, marine mammalogy, biological oceanography, wetlands ecology, marine conservation and management, biospeleology, biodiversity, seafood microbiology, genomics, toxicology, physiology and evolutionary biology. Marine biology undergraduate students obtain employment with State and Federal agencies, private industry, environmental consulting entities, biomedical research, zoos and aquariums, and teaching. Many undergraduates pursue postgraduate studies in marine biology, as well as in the fields of medicine, veterinary sciences and environmental law.

Faculty

Alvarado-Bremer, Jaime, Associate Professor
Marine Biology
PHD, University of Toronto, 1994

Armitage Chan, Anna R, Associate Professor
Marine Biology
PHD, University of California, Los Angeles, 2003

Borda, Elizabeth, Lecturer
Marine Biology
PHD, City University of New York, 2007
Davis, Randall W, Professor
Marine Biology
PHD, University of California, San Diego, 1980

Ditty, James, Lecturer
Marine Biology
PHD, Louisiana State University, 2002

Eytan, Ron I, Assistant Professor
Marine Biology
PHD, Louisiana State University, 2010

Guillen, George J, Lecturer
Marine Biology
PHD, The University of Texas Health Science Center at Houston, 1996

Hala, David, Assistant Professor
Marine Biology
PHD, Brunel University, 2007

Hall, Christopher, Lecturer
Marine Biology
MBA, Texas A&M University, 2003

Hill, Ron, Lecturer
Marine Biology
PHD, University of Puerto Rico-Mayaguez, 2002

Hochman, Mona E, Lecturer
Marine Biology
MS, University of Maryland, 2000

Iliffe, Thomas M, Professor
Marine Biology
PHD, The University of Texas Medical Branch at Galveston, 1977

Labonte, Jessica, Assistant Professor
Marine Biology
PHD, University of British Columbia, 2016

Liu, Hui, Assistant Professor
Marine Biology
PHD, University of Alaska Fairbanks, 2006

Marshall, Christopher, Professor
Marine Biology
PHD, University of Florida, 1997

Metz, Tasha L, Lecturer
Marine Biology
PHD, Texas A&M University, 2004

Miglietta, Maria P, Assistant Professor
Marine Biology
PHD, Duke University, 2005

O’Neal, Clifford C, Lecturer
Marine Biology
PHD, Southern Illinois University, 2005

Petersen, Lene H, Instructional Assistant Professor
Marine Biology
PHD, Memorial University of New Foundland, 2010

Quigg, Antonietta S, Professor
Marine Biology
PHD, Monash University, 2000

Rooker, Jay R, Professor
Marine Biology
PHD, The University of Texas at Austin, 1997

Rowe, Gilbert T, Professor
Marine Biology
PHD, Duke University, 1968
CERT, US Coast Guard, 1996

Schulze, Anja, Associate Professor
Marine Biology
PHD, University of Victoria, Canada, 2001

Schwarz, John R, Senior Professor
Marine Biology
PHD, Rensselaer Polytechnic Institute, 1972

St Clair, Katherine I, Lab Instructor
Marine Biology
MS, Texas A&M University, 2014

Wells, R.J. David, Associate Professor
Marine Biology
PHD, Louisiana State University, 2007

Würsig, Bernd, Senior Professor
Marine Biology
PHD, State University of New York at Stony Brook, 1978

Majors

• Bachelor of Science in Marine Biology (p. 671)
• Bachelor of Science in Marine Biology, License Option (p. 672)
• Bachelor of Science in Marine Fisheries (p. 674)

Minors

• Marine Biology Minor (p. 675)

Marine Biology - BS

This program explores the biological sciences through studies in the unique coastal environment. The curriculum offers broad training in general biology, while emphasizing the local flora and fauna in estuaries and the marine environment. Students receive hands-on field sampling experience as well as internship and research opportunities. Students may take electives to emphasize certain interests such as vertebrate zoology, coastal wetlands ecology, conservation, comprehensive biology, fisheries biology, mammalogy, and aquatic animal health. Students may also choose electives to allow them to pursue medical or veterinary degree programs.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111 Introductory Biology I 1,2</td>
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</tr>
<tr>
<td>CHEM 101 Fundamentals of Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>Semester</td>
<td>Course</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>Fall</td>
<td>CHEM 111 Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td></td>
<td>MATH 142 Business Calculus</td>
</tr>
<tr>
<td></td>
<td>or MATH 151 Engineering Mathematics I</td>
</tr>
<tr>
<td></td>
<td>American history (p. 25)</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
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<tr>
<td></td>
<td><strong>Spring</strong></td>
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<tr>
<td></td>
<td>BIOL 112 Introductory Biology</td>
</tr>
<tr>
<td></td>
<td>CHEM 102 Fundamentals of Chemistry II</td>
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<td></td>
<td>CHEM 112 Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td></td>
<td>ENGL 104 Composition and Rhetoric</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>MATH 141 Finite Mathematics</td>
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<td></td>
<td>MATH 150 Functions, Trigonometry and Linear Systems</td>
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<tr>
<td></td>
<td>MATH 152 Engineering Mathematics II</td>
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<tr>
<td></td>
<td>PHIL 240 Introduction to Logic</td>
</tr>
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<td></td>
<td>American history (p. 25)</td>
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<td></td>
<td><strong>Semester Credit Hours</strong></td>
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<tr>
<td></td>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td></td>
<td>Fall</td>
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<tr>
<td></td>
<td>CHEM 227 Organic Chemistry I</td>
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<tr>
<td></td>
<td>CHEM 237 Organic Chemistry Laboratory</td>
</tr>
<tr>
<td></td>
<td>MARB 315 Natural History of Vertebrates</td>
</tr>
<tr>
<td></td>
<td>PHYS 201 College Physics</td>
</tr>
<tr>
<td></td>
<td>or PHYS 218 Mechanics</td>
</tr>
<tr>
<td></td>
<td>POLS 206 American National Government</td>
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<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
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<tr>
<td></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td></td>
<td>CHEM 228 Organic Chemistry II</td>
</tr>
<tr>
<td></td>
<td>CHEM 238 Organic Chemistry Laboratory</td>
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<tr>
<td></td>
<td>MARB 303 Biostatistics</td>
</tr>
<tr>
<td></td>
<td>PHYS 202 College Physics</td>
</tr>
<tr>
<td></td>
<td>or PHYS 208 Electricity and Optics</td>
</tr>
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<td></td>
<td>POLS 207 State and Local Government</td>
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<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
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<tr>
<td></td>
<td><strong>Third Year</strong></td>
</tr>
<tr>
<td></td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>ENGL 210 Technical and Business Writing</td>
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<tr>
<td></td>
<td>MARB 301 Genetics</td>
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<td></td>
<td>Marine biology elective</td>
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<td></td>
<td><strong>Semester Credit Hours</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td></td>
<td>MARB 310 Introduction to Cell Biology</td>
</tr>
<tr>
<td></td>
<td>MARB 435 Marine Invertebrate Zoology</td>
</tr>
<tr>
<td></td>
<td>Marine biology elective</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral sciences (p. 25)</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Fourth Year</strong></td>
</tr>
<tr>
<td></td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>MARB 425 Marine Ecology</td>
</tr>
<tr>
<td></td>
<td>MARB 430 Coastal Plant Ecology</td>
</tr>
<tr>
<td></td>
<td>Earth science elective</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours** 120

All electives must be chosen in consultation with, and approved by, the student’s academic advisor. Unless courses are specifically listed, see University Core Curriculum at [http://core.tamu.edu/](http://core.tamu.edu/) for a listing of course options for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements. Up to 4 hours of MARB 491 and/or MARB 484 may be used as marine biology elective courses in your curriculum. Please consult with your academic advisor.

1. A grade of C or better is required before advancing to upper level courses.
2. Indicates required courses in the Marine Biology major. These courses will be used to compute the major GPR.
3. The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses.
4. There are two mathematics course requirements. The first is MATH 142 or 151. The other math course shall be selected from MATH 141, 150, 152, or PHIL 240. Depending on the math sequence selected, the number of credit hours may vary by 1 or 2 credits. Credit will not be given for both MATH 151 and MATH 142.
5. 20 credit hours of biology electives required. A minimum of 12 credit hours must be taken from the following: BIOL 351; MARB 311, MARB 330, MARB 335, MARB 340, MARB 360, MARB 400, MARB 401, MARB 403, MARB 404, MARB 407, MARB 408, MARB 410, MARB 430, MARB 466; MARB 360. For the remainder of the 20 hours of marine biology electives, students may take a maximum of two mammals courses (selected from MARB 400, MARB 401, MARB 403, MARB 404, MARB 407), one of the two MARB scientific diving courses (either MARB 345 or MARB 350), or any other MARB 300-499 level classes.
6. Designated writing intensive course.
7. The Earth Science elective may be chosen from GEOL 101-499, OCNG 251-499, or METR 302.
8. MARB 408, which is offered in the Spring semester, can be substituted for MARB 430. MARB 408 is also a writing intensive course.

**Marine Biology - BS, License Option**

The Marine Biology License Option program allows the marine biology student to prepare for a career as an officer aboard a sea going vessel by participating in the Texas A&M Maritime Academy Corps of Midshipmen. The curriculum provides the basics of marine biology as well as courses.
leading toward licensing as a Third Mate of any gross tonnage upon oceans, steam, or motor vessels, in the U.S. Merchant Marine.

The Marine Biology License Option curriculum is an abbreviated version of the Marine Biology curriculum and is oriented toward field activities consistent with service aboard research vessels. Students who wish to attend a biologically-oriented graduate program, or are interested in the medical professions, are advised to take additional coursework in developmental biology, genetics, biochemistry, and physiology.

Midshipmen who enroll in and apply to graduate in this curriculum must pass the license examination for Third Mate in order to graduate from Texas A&M University. Certain USCG courses require a minimum grade of C (70%).

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I $^{1,2}$</td>
</tr>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<tr>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
</tr>
<tr>
<td>MART 103</td>
<td>Basic Safety and Lifeboatman Training $^3$</td>
</tr>
<tr>
<td>MART 201</td>
<td>Vessel Structure and Ship Knowledge $^3$</td>
</tr>
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<td>Select one from:</td>
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<tr>
<td>MATH 141</td>
<td>Finite Mathematics</td>
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<td>MATH 150</td>
<td>Functions, Trigonometry and Linear Systems</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>MATH 166</td>
<td>Topics in Contemporary Mathematics II</td>
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<tr>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
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</table>

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<thead>
<tr>
<th>Spring</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II $^{1,2}$</td>
</tr>
<tr>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
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<td>CHEM 112</td>
<td>Fundamentals of Chemistry Laboratory II</td>
</tr>
<tr>
<td>MART 115</td>
<td>Seamanship I $^3$</td>
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<tr>
<td>MART 204</td>
<td>Terrestrial Navigation $^3$</td>
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<tr>
<td>Select one from:</td>
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<tr>
<td>MATH 142</td>
<td>Business Calculus</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>Any calculus course</td>
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| Semester Credit Hours | 17 |

<table>
<thead>
<tr>
<th>Summer</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>MARB 303</td>
<td>Biostatistics $^2$</td>
</tr>
<tr>
<td>MARB 315</td>
<td>Natural History of Vertebrates $^2$</td>
</tr>
<tr>
<td>MART 210</td>
<td>Integrated Navigation I: RADAR/ARPA/ECDIS $^3$</td>
</tr>
<tr>
<td>MART 212</td>
<td>Marine Dry Cargo Operations $^3$</td>
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<tr>
<td>MART 321</td>
<td>Navigation Rules, International and Inland $^3$</td>
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<table>
<thead>
<tr>
<th>Summer</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MART 202</td>
<td>Ship Stability and Trim $^3$</td>
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<tr>
<td>MART 307</td>
<td>Global Maritime Distress Safety System $^3$</td>
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<tr>
<td>MART 310</td>
<td>Integrated Navigation II: Electronic Navigation $^3$</td>
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<tr>
<td>MART 313</td>
<td>Marine Liquid Cargo Operations $^3$</td>
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<td>POLS 206</td>
<td>American National Government</td>
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| Semester Credit Hours | 14 |

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>MARB 310</td>
<td>Introduction to Cell Biology $^2$</td>
</tr>
<tr>
<td>MARB 425</td>
<td>Marine Ecology $^2$</td>
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<tr>
<td>MART 410</td>
<td>Integrated Navigation III: Bridge Watchstanding $^{3,5}$</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
<td>Creative arts (p. 24)</td>
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</tr>
</tbody>
</table>

| Semester Credit Hours | 16 |
Marine Fisheries - BS

This program provides educational opportunities in the biological sciences, with emphasis of marine management. Ecology, taxonomy, zoogeography, culture, and general biology of commercial species are emphasized. Course offerings are structured to provide not only a strong basis of formal academic instruction but also considerable hands-on field and collection experience by taking advantage of the coastal location of the University. A strong preparation in the sciences is recommended. Marine Fisheries graduates are prepared to work as fisheries managers or research biologists for state and federal agencies, ecological consulting firms, and educational institutions. Qualified degree recipients may undertake postgraduate studies in resource management, mariculture, systematics, seafood technology, and fisheries economics.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>BIOL 111</td>
<td>Introductory Biology I 1,2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td>3</td>
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<td></td>
<td>CHEM 111</td>
<td>Fundamentals of Chemistry Laboratory I</td>
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<td></td>
<td>MATH 142</td>
<td>Business Calculus 3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or MATH 151</td>
<td>Engineering Mathematics I</td>
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<td></td>
<td>American history (p. 25)</td>
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<tr>
<td>Summer</td>
<td>MART 300</td>
<td>Introductory Marine Science Laboratory</td>
<td>3</td>
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<td>MART 307</td>
<td>Fundamentals of Chemistry Laboratory II</td>
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<tr>
<td></td>
<td>PHIL 240</td>
<td>Introduction to Logic</td>
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<td></td>
<td>American history (p. 25)</td>
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#### Second Year

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<tr>
<td>Fall</td>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
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<td>CHEM 237</td>
<td>Organic Chemistry Laboratory</td>
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<td></td>
<td>MARB 315</td>
<td>Natural History of Vertebrates 4</td>
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<td>PHYS 201</td>
<td>College Physics</td>
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<td>POLS 206</td>
<td>American National Government</td>
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#### Third Year

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<tbody>
<tr>
<td>Fall</td>
<td>MARB 301</td>
<td>Genetics 1</td>
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<td>MARB 303</td>
<td>Biostatistics 1</td>
<td>3</td>
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<td></td>
<td>MARB 312</td>
<td>Field Ichthyology 1</td>
<td>4</td>
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<tr>
<td></td>
<td>MARB 435</td>
<td>Marine Invertebrate Zoology 1,4</td>
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<tr>
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<td>ECON 202</td>
<td>Principles of Economics</td>
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<td>MARB 360</td>
<td>Marine Conservation Biology 1</td>
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<td>MARS 252</td>
<td>Introductory Marine Science Laboratory</td>
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<td>OCNG 251</td>
<td>Oceanography</td>
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All electives must be chosen in consultation with, and approved by, the student's academic advisor. Unless courses are specifically listed, see University Core Curriculum at http://core.tamu.edu/ for a listing of course options for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements.

1 Indicates required courses in the Marine Fisheries major. These courses will be used to compute the major GPR.
2 A grade of C or better is required before advancing to upper level courses.
3 There are two mathematics course requirements. The first is MATH 142 or MATH 151. The other math course shall be selected from MATH 141, MATH 150, MATH 152, or PHIL 240. Depending on the math sequence selected, the number of credit hours may vary by 1 or 2 credits. Credit will not be given for both MATH 151 and MATH 142.
4 Designated writing intensive course.
5 Directed Electives must be selected from MARB 300-499 (p. 870).
* The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses.

### Marine Biology - Minor

Students in other majors may establish a minor field of study in Marine Biology through completing 16 credits of MARB course selected in consultation with a Marine Biology advisor, choosing from the courses listed below. The student must have earned a C or better in BIOL 111 and BIOL 112.

#### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select from: ¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARB 301</td>
<td>Genetics</td>
<td>4</td>
</tr>
<tr>
<td>MARB 311</td>
<td>Ichthyology</td>
<td>4</td>
</tr>
</tbody>
</table>

¹ All MARB 300-400 (p. 870) level courses require BIOL 111 and BIOL 112 with a grade of "C" or better.

### Department of Marine Engineering Technology

The goal of the Marine Engineering Technology (MARE) program with a license option is to produce graduates for performing engineering work in the marine sector or marine-related shore-based industries involving the design, production, operation, maintenance, and management of engineering systems and projects.

Opportunities for such work abound in the vicinity of the University, which is located just south of the fourth largest metropolitan in the United States. The Houston/Galveston area has extensive port facilities, considerable commercial, recreational, and military ship traffic, and ever-increasing offshore and onshore infrastructure associated with the oil industry. Career opportunities of various kinds (e.g. operational, management, leadership, etc.) are therefore available for these graduates who are ideally suited for working on ships, at port facilities, and at shore facilities, particularly in power generation, distribution, and concomitant auxiliary support systems. The program provides a License Option, intended for cadets of the U. S. Maritime Service Corps, who are required to pass the U. S. Coast Guard license examination, enabling them to serve as engineering officers aboard sea-going vessels.

Our goal is to produce graduates with a strong background in engineering fundamentals, mathematics, and analytical methods, which is reinforced by practical machine-shop, welding, and laboratory experiences (including several on the training ship). The curriculum builds on a foundation of basic engineering topics such as fluid mechanics, thermodynamics, electricity, drafting, and materials science to develop inter-disciplinary skills required for the practice of marine engineering. In particular, the program's educational objectives are to produce graduates who: (1) Can specify, operate, and maintain systems used in marine engineering systems and projects.

The curriculum in Marine Engineering Technology with the non-license option is to produce graduates for performing engineering work in the marine sector or marine-related shore-based industries involving the design, production, operation, maintenance, and management of engineering systems and projects.
Opportunities for such work abound in the vicinity of the University, which is located just south of the fourth largest metropolis in the U. S. The Houston/Galveston area has extensive port facilities, considerable commercial, recreational, and military ship traffic, and ever-increasing offshore and onshore infrastructure associated with the oil industry. Career opportunities of various kinds (e.g. operational, management, leadership, etc.) are therefore available for these graduates who are ideally suited for working on ships, at port facilities, and at shore facilities, particularly in power generation, distribution, and concomitant auxiliary support systems. The program provides a Non-License Option for students not intending to appear for the U. S. Coast Guard license examination.

Our goal is to produce graduates with a strong background in engineering fundamentals, mathematics, and analytical methods, which is reinforced by practical machine-shop, welding, and laboratory experiences (including several on the training ship). The curriculum builds on a foundation of basic engineering topics such as fluid mechanics, thermodynamics, electricity, drafting, and materials science to develop inter-disciplinary skills required for the practice of marine engineering. In particular, the program's educational objectives are to produce graduates who: (1) Can specify, operate, and maintain systems used in marine and facilities power systems and associated auxiliary systems (e.g. propulsion, electrical power generation and distribution, refrigeration, and air conditioning) in support of the maritime sector (the Navy, Coast Guard, and companies operating sea-going vessels), the offshore oil and gas industry, and companies involved in facilities management or shore-based power systems; in particular, to plan, design, construct, operate, and maintain systems such as those intended to provide marine propulsion and electrical power; and (2) Are well-prepared to engage in lifelong education, professional development, and continuous improvement.

Faculty

Carroll, Matthew C, Instructional Assistant Professor
Marine Engineering
PHD, University of Illinois at Urbana-Champaign, 1986

Clancy, Edward V, Professor
Marine Engineering
JD, Western State University, 2002
DEN, Stanford University, 1989

Coleman, Gerard T, Associate Professor of the Practice
Marine Engineering
MS, The George Washington University, 1996

Fredrickson, Henry W, Professor of the Practice
Marine Engineering
BS, Texas A&M University, 1968
CERT, United States Coast Guard, 1968

Kane, Matthew H, Associate Professor
Marine Engineering
PHD, Georgia Institute of Technology, 2007

Martinez, Rudy D, Instructional Assistant Professor
Marine Engineering
PHD, University of South Carolina, 2004

Moore, Andrew, Lecturer
Marine Engineering
BS, Texas A&M University, 2014
CERT, US Costal Guard, 2014

Nyakiti, Luke O, Assistant Professor
Marine Engineering
PHD, Texas Tech University, 2008

Schmidt, Joseph H, Lecturer
Marine Engineering
PHD, Texas A&M University, 1978

Treglia, Vincent, Instructional Assistant Professor
Marine Engineering
BS, State University of New York Maritime College, 1966
CERT, United States Coast Guard, 1966

Wilhite, Timothy, Lecturer
Marine Engineering
BS, Texas A&M University at Galveston, 1975
CERT, United States Coast Guard, 2012

Majors

- Bachelor of Science in Marine Engineering Technology (p. 676), Non-License Option
- Bachelor of Science in Marine Engineering Technology, License Option (p. 678)

Marine Engineering Technology - BS

Texas A&M University Galveston campus is a special purpose institution for teaching, research, and public service of marine and maritime studies in science, engineering, and business, leading to a degree from Texas A&M University. The goal of the Marine Engineering Technology (MARE) non-license option program is to produce graduates for performing engineering work in the marine sector or marine-related shore-based industries involving the design, production, operation, maintenance, and management of engineering systems and projects.

Opportunities for such work abound in the vicinity of the University, which is located just south of the fourth largest metropolis in the U. S. The Houston/Galveston area has extensive port facilities, considerable commercial, recreational, and military ship traffic, and ever-increasing offshore and onshore infrastructure associated with the oil industry. Career opportunities of various kinds (e.g. operational, management, leadership, etc.) are therefore available for these graduates who are ideally suited for working on ships, at port facilities, and at shore facilities, particularly in power generation, distribution, and concomitant auxiliary support systems. The program provides a Non-License Option for students not intending to appear for the U. S. Coast Guard license examination.

Our goal is to produce graduates with a strong background in engineering fundamentals, mathematics, and analytical methods, which is reinforced by practical machine-shop, welding, and laboratory experiences (including several on the training ship). The curriculum builds on a foundation of basic engineering topics such as fluid mechanics, thermodynamics, electricity, drafting, and materials science to develop inter-disciplinary skills required for the practice of marine engineering. In particular, the program’s educational objectives are to produce graduates who: (1) Can specify, operate, and maintain systems used in marine and facilities power systems and associated auxiliary systems (e.g.
propulsion, electrical power generation and distribution, refrigeration, and air conditioning) in support of the maritime sector (the Navy, Coast Guard, and companies operating sea-going vessels), the offshore oil and gas industry, and companies involved in facilities management or shore-based power systems; in particular, to plan, design, construct, operate, and maintain systems such as those intended to provide marine propulsion and electrical power; and (2) Are well-prepared to engage in lifelong education, professional development, and continuous improvement.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>3</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
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<td>1</td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
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<td>3</td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>3</td>
<td>MARE 100</td>
<td>Marine Engineering Fundamentals</td>
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<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td></td>
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<td>Semester Credit Hours 14</td>
</tr>
</tbody>
</table>

Spring

| 2                     | ENGR 111    | Foundations of Engineering I |
| 4                     | PHYS 218    | Mechanics |
| 4                     | MATH 152    | Engineering Mathematics II |
| 3                     | American history (p. 25) |
| 3                     | Creative arts (p. 24) |
|                       | Semester Credit Hours 16 |

Second Year

| 2                     | ENGR 112    | Foundations of Engineering II |
| 3                     | MARE 202    | Marine Thermodynamics |
| 3                     | MARE 205    | Engineering Mechanics I |
| 2                     | MARE 242    | Manufacturing Methods I |
| 4                     | PHYS 208    | Electricity and Optics |
| 3                     | Marine engineering elective |
|                       | Semester Credit Hours 17 |

Spring

| 3                     | MARE 206    | Engineering Mechanics II |
| 3                     | MARE 207    | Electrical Power I |
| 1                     | MARE 243    | Manufacturing Methods II |
| 3                     | MARE 261    | Engineering Analysis |
| 3                     | MARE 211    | Steam Propulsion Plants |
| 1                     | Marine Engineering Elective |
| 3                     | American history (p. 25) |
|                       | Semester Credit Hours 17 |

Third Year

| 3                     | MARE 209    | Mechanics of Materials |
| 4                     | MARE 305    | Fluid Mechanics Theory |
| 3                     | MARE 306    | Electrical Power II |
| 3                     | MARE 313    | Heat Transfer |

Fourth Year

| 3                     | MARE 307    | Marine Electronics |
| 3                     | MARE 405    | Fundamentals of Naval Architecture |
| 2                     | MARE 451    | Senior Design Project I |
| 3                     | POLS 206    | American National Government |
| 3                     | Marine engineering elective |
|                       | Semester Credit Hours 14 |

Spring

| 3                     | MARE 441    | Engineering Economics and Project Management |
| 2                     | MARE 452    | Senior Design Project II |
| 6                     | Marine engineering electives |
| 3                     | Social and behavioral sciences (p. 25) |
|                       | Semester Credit Hours 14 |

Total Semester Credit Hours 123

All electives must be chosen in consultation with, and approved by, the student’s academic advisor. Unless courses are specifically listed, see University Core Curriculum at http://core.tamu.edu/ for a listing of course options for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements. Although they may count for university credit, grades form another institution below a C in engineering, mathematics and physics will not be accepted by the TAMUG engineering programs toward the degree.

Directed elective

1 Indicates required courses in Marine Engineering major. These courses will be used to compute the major GPR.
2 MARR students are required to earn a grade of C or better in MATH 151, PHYS 218, PHYS 208, MARE 202, MARE 205, MARE 206 and MARE 207. Failure to meet this requirement will prevent the student from continuing any sequence in which the course is a prerequisite. Although they may count for credit, grades from another institution below a C in engineering, mathematics and physics will not be accepted by the TAMUG engineering programs toward the degree.
3 Directed electives are recommended to be MARS 306, MARS 330, MARS 370/GEOG 370, MARS 410, MARS 430, MARS 431, MARS 435 or MARS 440, in consultation with student advisor.
4 Designated writing intensive course.
Marine Engineering Technology - BS, License Option

The goal of the Marine Engineering Technology (MARE) program is to produce graduates for performing engineering work in the marine sector or marine-related shore-based industries involving the design, production, operation, maintenance, and management of engineering systems and projects.

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Program Requirements

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tr>
<td>CHEM 107 General Chemistry for Engineering Students</td>
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<tbody>
<tr>
<td>ENGR 111 Foundations of Engineering I</td>
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<tr>
<td>MARE 242 Manufacturing Methods I</td>
<td>2</td>
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<tr>
<td>MARE 102 Engine Room Resource Management and Dynamics</td>
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<td>MART 103 Basic Safety and Lifeboatman Training</td>
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<tr>
<td>PHYS 218 Mechanics</td>
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<td>MATH 152 Engineering Mathematics II</td>
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<th>Summer</th>
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<td>MARE 200 or MARR 200 Basic Operations</td>
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Second Year

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<tbody>
<tr>
<td>ENGR 112 Foundations of Engineering II</td>
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<tr>
<td>MARE 202 Marine Thermodynamics</td>
<td>3</td>
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<tr>
<td>MARE 205 Engineering Mechanics I</td>
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<td>PHYS 208 Electricity and Optics</td>
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<table>
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<tr>
<td>MARE 206 Engineering Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>MARE 207 Electrical Power</td>
<td>3</td>
</tr>
<tr>
<td>MARE 211 Steam Propulsion Plants</td>
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<tr>
<td>MARE 243 Manufacturing Methods II</td>
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<td>MARE 261 Engineering Analysis</td>
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<td>American history (p. 25)</td>
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<td>MARE 300 Intermediate Operations</td>
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<tr>
<td>MARE 350 Commercial Cruise Internship</td>
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<tr>
<td>MARR 300 Intermediate Operations</td>
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Third Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARE 209 Mechanics of Materials</td>
<td>3</td>
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<tr>
<td>MARE 305 Fluid Mechanics Theory</td>
<td>4</td>
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<td>MARE 306 Electrical Power II</td>
<td>3</td>
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<td>MARE 313 Heat Transfer</td>
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<tr>
<td>Creative arts (p. 24)</td>
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</table>

| Semester Credit Hours | 16 |
Spring
MARE 309  Marine Construction Materials 1  3
MARE 312  Diesel Propulsion Plants  3
POLS 207  State and Local Government  3
Communication (p. 22)  3
Language, philosophy and culture (p. 23)  3
Semester Credit Hours  15

Summer
MARE 400  Advanced Operations 1,2,4  or MARR 400  4
or Advanced Operations
Semester Credit Hours  4

Fourth Year
Fall
MARE 307  Marine Electronics 1  3
MARE 405  Fundamentals of Naval Architecture 1,2,6  3
MARR 451  Senior Capstone Project I 1  2
MART 498  Maritime Medical Care  2  2
NVSC 200  Naval Science for the Merchant Marine  3
POLS 206  American National Government  3
Semester Credit Hours  16

Spring
MARE 401  Marine Auxiliary Systems 1,2  3
MARE 402  Shipboard Automation and Control 1  3
MARE 441  Engineering Economics and Project Management  3
MARR 452  Senior Capstone Project II 1  2
Social and behavioral sciences (p. 25)  3
Semester Credit Hours  14
Total Semester Credit Hours  137

All electives must be chosen in consultation with, and approved by, the student's academic advisor. Unless courses are specifically listed, see University Core Curriculum at http://core.tamu.edu/ for a listing of course options for Communication, Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements. Although they may count for university credit, grades from an other institution be low a C in engineering, mathematics and physics will not be accepted by the TAMUG engineering programs toward the degree.

1 Indicates required courses in the Marine Engineering Technology License Option major. These courses will be used to compute the major GPR.

2 Indicates license courses leading to a USCG/STCW license endorsement or sea time credit accrual which require a minimum grade of C (70%) or better to earn the endorsement or accrual. Midshipmen will be required to repeat the course until they earn a grade of C (70%) or better. Failure to meet this requirement will prevent the student from continuing any sequence in which the course is a prerequisite.

3 MARR students are required to earn a grade of C or better in MATH 151, PHYS 218, PHYS 208, MARE 202, MARE 205, MARE 206, and MARE 207. Failure to meet this requirement will prevent the student from continuing any sequence in which the course is a prerequisite.

4 The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses, or any of the six hour cruise options. The six-hour cruise options (NAUT 200, NAUT 300, and NAUT 400 or MARR 200, MARR 300 and MARR 400) do not add any required hours to the degree plan.

5 Electives available from MARE 289-499 (p. 874) in consultation with student advisor.

6 Designated writing intensive course.

Department of Marine Sciences

The mission of the Department of Marine Sciences is to provide high quality undergraduate and graduate education and research in the physical sciences related to the coastal and marine environment as well as in management and policy decision-making for the utilization and preservation of marine resources. We recognize that today’s professional careers demand strong interdisciplinary as well as interpersonal skills and have designed our educational programs to provide a core education in the physical sciences and the necessary training for applying this knowledge to the maintenance and improvement of our marine resources. Our faculty are actively involved in research areas involving coastal marine geology, physical oceanography, marine geochemistry, and coastal resources management that emphasize and support our degrees and course curricula. Our strength is the diversity of our faculty who utilize their experience from private, governmental, and academic careers to create extraordinary learning opportunities for students through “hands on” and “on the water” field and laboratory research as well as internships that give our students a competitive advantage for employment after graduation.

We offer a variety of majors/minors/concentrations in the subjects related to coastal and marine environments. We offer the B.S. in Marine Sciences (MARS) or in Ocean and Coastal Resources (OCRE), as well as a B.S. in University Studies (USGA) with the concentration in Oceans and One Health (OOH). Students enrolled for the MARS degree will have the opportunity to select a track in physical, chemical, or geological marine sciences or an integrated track. The License Option Program (MARS/LO) is also available for the MARS majors to obtain a third mate’s license in the Merchant Marine upon graduation. This department offers a minor in OCRE, as well as minors in Chemistry, Geology, and Oceanography through the respective departments at TAMU. Our graduate program offers the Master of Marine Resources Management (MARM). We also have a 3+2 Program in which the student can achieve the B.S. OCRE with the MARM degree in 5 years. Our faculty advise students in diverse M.S. and Ph.D. graduate degrees on our campus such as the Interdisciplinary Program in Marine Biology (MARBP IDP) and programs in conjunction with TAMU’s Departments such as Oceanography (OCNG) and Landscape Architecture & Urban Planning (LAUP).

Faculty

Alexander, Steve K, Lecturer
Marine Sciences
PHD, Louisiana State University, 1976
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Department of Marine Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amon, Rainer</td>
<td>Professor</td>
<td>Marine Sciences</td>
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<td>Santschi, Peter H</td>
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<td>Seitz, William A</td>
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<td>Van Hengstum, Peter J</td>
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<td>Van Hengstum, Peter J</td>
<td>Assistant Professor</td>
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</tbody>
</table>
von Zharen, Wyndylyn, Senior Professor
Marine Sciences
DED, University of Florida, 1976

Majors

• Bachelor of Science in Marine Sciences (p. 681)
• Bachelor of Science in Marine Sciences, License Option (p. 682)
• Bachelor of Science in Ocean and Coastal Resources (p. 684)
• Bachelor of Science in Ocean and Coastal Resources and Master of Marine Resources Management, 5-Year Degree Program (p. 685)
• Bachelor of Science in University Studies, Oceans and One Health Concentration (p. 687)

Minors

• Ocean and Coastal Resources Minor (p. 688)

Marine Sciences - BS

Overview

The Marine Sciences curriculum concentrates on the physical and chemical science aspects of the estuarine, coastal, and marine environment. The coastal location of the campus enables students to acquire extensive hands-on field experience in addition to a solid base of academic instruction in chemistry, geology, physics, biology, oceanography and mathematics. All marine science majors take five semesters of oceanography, a course in geographic information systems (GIS) and an integrated, field-oriented laboratory class. In the senior year students will participate in 2 semesters of research with the faculty culminating in a poster presentation of their research. The tracks allow the student to select a discipline for focusing their coursework and preparing them to enter graduate programs in Oceanography, related disciplines or to work in companies that need expertise in this area. For example, choosing the chemistry track allows the student to focus on chemical aspects of marine sciences, and it will also enable students to obtain a chemistry minor through the chemistry department at Texas A&M University in College Station with coursework completed in Galveston. Similarly, the geology track can lead to a minor in geology. An advisor in MARS can help you select courses and facilitate the minor approval process.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
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<th>Course Title</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<td>and Fundamentals of Chemistry Laboratory I</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>GEOL 101</td>
<td>Principles of Geology</td>
<td>4</td>
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<td>&amp; GEOL 102</td>
<td>and Principles of Geology Laboratory</td>
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<td>MARS 101</td>
<td>Marine Science Matters</td>
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<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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Spring

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<tbody>
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<td>and Fundamentals of Chemistry Laboratory II</td>
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<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>OCNG 251</td>
<td>Oceanography</td>
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<tr>
<td>&amp; MARS 252</td>
<td>and Introductory Marine Science Laboratory $^2$</td>
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<td>Communication (p. 22)</td>
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Second Year

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Fall

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<tr>
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<td>Introductory Biology I</td>
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<td>MARS 210</td>
<td>Marine Geography $^2$</td>
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<td>PHYS 218</td>
<td>Mechanics</td>
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Spring

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<tr>
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<td>Sophomore Seminar in Marine Sciences $^{1,2}$</td>
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<td>PHYS 208</td>
<td>Electricity and Optics</td>
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Third Year

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Fall

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<tr>
<td>MARS 303</td>
<td>Computing and Data Display $^2$</td>
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<td>MARS 410</td>
<td>Physical Oceanography $^2$</td>
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<td>OCNG 420</td>
<td>Biological Oceanography $^2$</td>
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<td>POLS 207</td>
<td>State and Local Government</td>
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Spring

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<th>Course Title</th>
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<tr>
<td>MARS 365</td>
<td>Integrated Marine Sciences Laboratory $^2$</td>
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<tr>
<td>MARS 430 or MARS 431</td>
<td>Geological Oceanography-Plate Tectonics $^{1,2}$</td>
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<tr>
<td>or Geological Oceanography-Earth’s Climate</td>
<td></td>
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<tr>
<td>MARS 440</td>
<td>Chemical Oceanography $^2$</td>
<td>3</td>
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<td>Creative arts (p. 24)</td>
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<td>3</td>
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Fourth Year

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<tr>
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<td>Introduction to GIS for Marine Sciences $^2$</td>
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<tr>
<td>MARS 460</td>
<td>Capstone Undergraduate Research Experience $^2$</td>
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<td>MARS 491</td>
<td>Research in Marine Sciences $^2$</td>
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<td>POLS 206</td>
<td>American National Government</td>
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<td>Language, philosophy and culture (p. 23)</td>
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Spring

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**Spring**

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<td>Capstone Undergraduate Research Experience II</td>
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<td>MARS 481</td>
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<td>Research in Marine Sciences</td>
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**Total Semester Credit Hours** 13

---

1. Writing intensive course.
2. Course counts towards major GPR.
3. 3 hours must be International and Cultural Diversity (p. 40). This requirement can be met with courses used to satisfy other degree requirements.
4. Hours vary depending on track focus electives chosen.

### Track Options

#### Chemical Marine Science

**Focus electives**

<table>
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<tr>
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<tbody>
<tr>
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<td>and Organic Chemistry Laboratory</td>
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<tr>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>4</td>
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<tr>
<td>&amp; CHEM 238</td>
<td>and Organic Chemistry Laboratory</td>
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**Breadth electives** 12

- Select four of the following:
  - ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution
  - MARS 340 Geochemistry
  - MARS 360 Biochemistry
  - MARS 470 Eco-Environmental Modeling
  - STAT 303 Statistical Methods
  - CHEM 300 to 499 (p. 752)

**Total Semester Credit Hours** 20

#### Geological Marine Science

**Focus electives**

<table>
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<td>Historical Geology</td>
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<tr>
<td>MARS 306</td>
<td>Coastal Sedimentary Geology</td>
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**Breadth electives** 12

- Select four of the following:
  - GEOL 300 to 499 (p. 826)
  - MARS 305 Environmental Micropaleontology
  - MARS 340 Geochemistry
  - MARS 370/ Coastal Processes
  - GEOG 370
  - MARS 415 Remote Sensing Technology
  - MARS 430 Geological Oceanography-Plate Tectonics

**Total Semester Credit Hours** 20

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### Integrated Track

**Focus electives**

- Select one of the following: 3-4
  - CHEM 227 Organic Chemistry I
  & CHEM 237 and Organic Chemistry Laboratory
  - MARS 306 Coastal Sedimentary Geology
  - MATH 251 Engineering Mathematics III

- Select one of the following: 3-4
  - CHEM 228 Organic Chemistry II
  & CHEM 238 and Organic Chemistry Laboratory
  - GEOL 106 Historical Geology
  - MATH 308 Differential Equations

**Breadth elective** 12

- Select four of the following:
  - GEOL 300 to 499 (p. 826)
  - MARS 300 to 499 (p. 877)
  - MARS 300 to 499 (p. 933)
  - MARS 489 Special Topics in Marine Sciences

**Total Semester Credit Hours** 18-20

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### Physical Marine Science

**Focus electives**

- MATH 251 Engineering Mathematics III 3
- MATH 308 Differential Equations 3
- Breadth electives 12

- Select four of the following:
  - ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution
  - MARS 408 Estuarine and Coastal Hydrodynamics
  - MARS 415 Remote Sensing Technology
  - MARS 470 Eco-Environmental Modeling
  - MARS 489 Special Topics in Marine Sciences
  - STAT 303 Statistical Methods
  - PHYS 300 to 499 (p. 933)

**Total Semester Credit Hours** 18

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### Marine Sciences - BS, License Option

The license option (LO) in this curriculum leads toward a license as a deck officer in the United States Merchant Marine. This program retains the basic physical science core of the Marine Sciences curriculum, and adds coursework which prepares the student to sit for the U.S. Coast Guard examination as a Third Mate of any gross tonnage upon
oceans, steam, or motor vessels. Students combine a broad base of courses in physical science and mathematics and practical instruction in seamanship and navigation with four oceanography courses. The objective of the program is to provide students with a sound intellectual and educational background to function in a scientifically and technologically advanced society, while also providing the practical hands-on training needed for employment in the maritime industry. Graduates are particularly well qualified to serve on research vessels where an understanding of the scientific purpose of the voyage is required. Students who wish to enter a physical science graduate program will need to take additional course work in science and mathematics. Midshipmen who enroll in and apply to graduate under one of the license option curricula must complete the appropriate license examination for Third Mate or Third Assistant Engineer in order to graduate from Texas A&M University. Certain USCG courses require a minimum grade of C (70%).

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>GEOL 101</td>
<td>Principles of Geology</td>
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<tr>
<td>&amp; GEOL 102</td>
<td>Principles of Geology Laboratory</td>
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<td>MARS 101</td>
<td>Marine Science Matters</td>
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<tr>
<td>MARS 103</td>
<td>Basic Safety and Lifeboatman Training</td>
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<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<tr>
<td>Spring</td>
<td>OCN 251</td>
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<tr>
<td>MARS 252</td>
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<td>MART 115</td>
<td>Seamanship</td>
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<td>Terrestrial Navigation</td>
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<tr>
<td>Summer</td>
<td>Summer Cruise: select from</td>
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<td>MART 200</td>
<td>Deck Sea Training I: Basic Communications, Navigation and Seamanship</td>
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<td>Marine Geography</td>
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<td>MART 202</td>
<td>Ship Stability and Trim</td>
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<td>MART 212</td>
<td>Marine Dry Cargo Operations</td>
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| Spring | MART 210 | Integrated Navigation I: RADAR/ARPA/ECDIS | 4 |
| MART 215 | Seamanship II | 3 |
| MART 303 | Celestial Navigation | 3 |
| MART 321 | Navigation Rules, International and Inland | 2 |
| Semester Credit Hours | 17 |
| Summer | Summer Cruise: select from | 4 |
| MART 300 | Deck Sea Training II: Intermediate Communications, Navigation and Seamanship | |
| MART 350 | Deck Sea Training II – Commercial Internship | |
| Semester Credit Hours | 4 |

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<td>MART 310</td>
<td>Integrated Navigation II: Electronic Navigation</td>
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<td>NVSC 200</td>
<td>Naval Science for the Merchant Marine Officer</td>
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<tr>
<td>PHYS 218</td>
<td>Mechanics</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
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<tr>
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| Spring | MARS 303 | Computing and Data Display | 3 |
| MARS 440 | Chemical Oceanography | 3 |
| MART 307 | Global Maritime Distress Safety System | 3 |
| MART 313 | Marine Liquid Cargo Operations | 3 |
| PHYS 208 | Electricity and Optics | 4 |
| Semester Credit Hours | 16 |
| Summer | Summer cruise: select from | 4 |
| MART 400 | Deck Sea Training III: Advanced Communications, Navigation and Seamanship | |
| Semester Credit Hours | 4 |

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Fall</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARS 325</td>
<td>Introduction to GIS for Marine Sciences</td>
<td>3</td>
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<tr>
<td>MART 410</td>
<td>Physical Oceanography</td>
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<tr>
<td>MART 481</td>
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<td>MART 208</td>
<td>Maritime Meteorology</td>
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<td>MART 410</td>
<td>Integrated Navigation III: Bridge Watchstanding</td>
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<tr>
<td>Language, philosophy and culture (p. 23)</td>
<td>3</td>
<td></td>
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<tr>
<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
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<tr>
<td>Spring</td>
<td>MARS 310</td>
<td>Field Methods in Marine Sciences</td>
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</table>
Ocean and Coastal Resources - BS

Ocean and Coastal Resources (OCRE) graduates often operate at the interface between government and businesses with scientific operations. They can navigate the regulatory path from either the side of the developer or the permitting agency. This degree program prepares students with regard to the economic, environmental and social issues related to the development of marine and coastal resources, while providing them with the scientific background needed to understand these issues. These resources include fisheries, oil and gas, ocean mining, beach sand, wetlands and others. The OCRE degree provides a foundation in oceanography, geology, chemistry, biology and physics with additional coursework in geological and biological sciences, along with economics, policy and management. The OCRE curriculum is oriented toward the societal and environmental impacts of ocean science. Many of the resource development issues in today’s world center around environmental pollution, sustainable development, biological diversity, fisheries and mariculture or oil and gas development. There is good demand for trained entry-level personnel from both government and industry for individuals who understand and can use scientific information in the planning and management process, but who are not themselves bench or field scientists. A significant number of our graduates chooses to enter graduate programs in resource management or policy.

Students in OCRE may choose to establish a minor field of study, for example in Economics (TAMU) or in Maritime Administration (TAMUG) through completion of credits as outlined in the available minors curriculum pages. A minor in Ocean and Coastal Resources is available for students of other majors. Obtaining a minor from a department located at TAMU in College Station with coursework completed in Galveston is possible. An advisor in MARS can help you select courses and facilitate the minor approval process through another department.

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>ENGL 104 Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 101 Principles of Geology</td>
<td>4</td>
</tr>
<tr>
<td>&amp; GEOL 102 and Principles of Geology Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 111 Introductory Biology I</td>
<td>4</td>
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<tr>
<td>MARS 101 Marine Science Matters</td>
<td>3</td>
</tr>
<tr>
<td>MATH 142 Business Calculus</td>
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<tr>
<td>or MATH 151 or Engineering Mathematics I</td>
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<td>Semester Credit Hours</td>
<td>16</td>
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<tr>
<td>Spring</td>
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<tr>
<td>BIOL 112 Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141 Finite Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 152 or Engineering Mathematics II</td>
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<tr>
<td>OCGN 251 Oceanography</td>
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<tr>
<td>&amp; MARS 252 and Introductory Marine Science Laboratory</td>
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<td>POLS 207 State and Local Government</td>
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<td>Fall</td>
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<td>CHEM 101 Fundamentals of Chemistry I</td>
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<tr>
<td>&amp; CHEM 111 and Fundamentals of Chemistry Laboratory I</td>
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<tr>
<td>ECON 202 Principles of Economics</td>
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</tr>
<tr>
<td>MARS 280 Coastal and Ocean Resources</td>
<td>3</td>
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<tr>
<td>MARS 281 Sophomore Seminar in Marine Sciences</td>
<td>1</td>
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<tr>
<td>PHYS 218 Mechanics</td>
<td>4</td>
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<td>or PHYS 201 or College Physics</td>
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<td>Semester Credit Hours</td>
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<td>Spring</td>
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<tr>
<td>CHEM 102 Fundamentals of Chemistry II</td>
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<td>&amp; CHEM 112 and Fundamentals of Chemistry Laboratory II</td>
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<td>COMM 203 Public Speaking</td>
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<td>ECON 203 Principles of Economics</td>
<td>3</td>
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<tr>
<td>MARS 210 Marine Geography</td>
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</tr>
</tbody>
</table>
### Ocean and Coastal Resources - 5-Year Bachelor of Science/Master of Marine Resources Management

5-Year Curriculum: B.S. in Ocean and Coastal Resources (OCRE) and Master of Marine Resources Management (MARM)

The OCRE + MARM Program allows Ocean and Coastal Resources majors to enter the graduate program for a Master of Marine Resources Management at the beginning of their senior year, enabling students to receive their OCRE undergraduate degree (B.S.) and a Master of Marine Resources Management (MARM) graduate degree in five years. Ocean and Coastal Resources majors who have at least a 3.25 GPA and who will have taken all of their prerequisite courses and otherwise completed 101 or 102 hours by the fall of their fourth year will be eligible to apply for the 5-year program during their junior year. Applicants to the 5-year program will submit the same materials (including GRE scores) and be subject to the same admission criteria as other MARM program applicants. Those students whose records are judged to be competitive by the mid-January deadline will be admitted.

Admitted students will be enrolled in Marine Resources Management graduate courses with an undergraduate classification (U4) during the fall of their fourth year. They will then be reclassified as degree-seeking master’s students (G7) upon completing 120 credit hours, which will typically occur at the beginning of the fall semester of the fifth year. Students will be required to complete the same 2-year, 36-hour curriculum as other graduate students admitted to the MARM Professional Track (see MARM curriculum). Students who are interested in the MARM Research (Thesis) Track are afforded additional flexibility to replace required courses with up to nine hours of 691 (research) courses and electives chosen with the approval of their advisory committee. To comply with the course and work requirements of the research track, this program may extend beyond the 5 year window. For specific
requirements to comply with the Research Track curriculum, students are asked to consult the MARM section of the catalog.

Students who choose not to finish the MARM degree after being admitted to the 5-year program may exit the program at any time. Completed MARM courses will be applied to their bachelor’s degree in Ocean and Coastal Resources, as appropriate. Failure to complete the MARM program will in no way impede their ability to attain a bachelor’s degree in Ocean and Coastal Resources when the requirements for that degree are completed. Those who pursue the 5-year program will obtain both degrees upon the completion of the 5-year program, receiving both their Bachelor of Science and the Master of Marine Resources Management degrees at the end of year five. Advising for the 5-year program is a coordinated effort by the Department of Marine Sciences undergraduate and graduate advisors and by the Office of Graduate Studies. Advising will help ensure that interested students have satisfied the prerequisite course requirements for the bachelor’s degree so that they may enter the 5-year program. OCRE students can speak to Dr. Melanie Moser at moserm@tamug.edu or phone 409.740.4517. The MARM advisor is Dr. Wesley Highfield at highfiew@tamug.edu or phone 409.740.4726.

### Program Requirements

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
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<td>Introductory Biology I</td>
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<td>GEOL 101</td>
<td>Principles of Geology</td>
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<td>&amp; GEOL 102</td>
<td>Principles of Geology Laboratory</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
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<td>MATH 142</td>
<td>Business Calculus</td>
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<td>MATH 151</td>
<td>Engineering Mathematics I</td>
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<td>MARS 101</td>
<td>Marine Science Matters</td>
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<td></td>
<td>MARS 210</td>
<td>Marine Geography</td>
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<tr>
<td></td>
<td>MARS 252</td>
<td>Introductory Marine Science Laboratory</td>
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<td></td>
<td>MATH 141</td>
<td>Finite Mathematics</td>
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<td>&amp; MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>OCNG 251</td>
<td>Oceanography</td>
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<td>State and Local Government</td>
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| Spring   | BIOL 112    | Introductory Biology II                          | 4            |
|          | MARS 250    | Introductory Marine Science Laboratory           | 3            |
|          | MATH 141    | Finite Mathematics                               | 1            |
|          | OCNG 251    | Oceanography                                     |              |
|          | POLS 207    | State and Local Government                       |              |
|          |              | Semester Credit Hours                            | 15           |

<table>
<thead>
<tr>
<th>Second Year</th>
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<th>Course Title</th>
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<tbody>
<tr>
<td></td>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
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<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory</td>
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<td></td>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<td></td>
<td>MARS 280</td>
<td>Coastal and Ocean Resources ¹ ²</td>
<td>3</td>
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<td></td>
<td>MARS 281</td>
<td>Sophomore Seminar in Marine Sciences ¹</td>
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<td></td>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
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<td>or PHYS 201</td>
<td>or College Physics</td>
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<th>Credit Hours</th>
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<tr>
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<td>MARS 310</td>
<td>Field Methods in Marine Sciences ¹ ³</td>
<td>3</td>
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<td></td>
<td>MARS 430</td>
<td>Geological Oceanography-Plate Tectonics ¹ ²</td>
<td>3</td>
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<tr>
<td></td>
<td>MARS 431</td>
<td>Geological Oceanography-Earth’s Climate</td>
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<tr>
<td></td>
<td>STAT 303</td>
<td>Statistical Methods</td>
<td>3</td>
<td></td>
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<th>Fall</th>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>MARS 325</td>
<td>Introduction to GIS for Marine Sciences ⁵</td>
<td>3</td>
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<tr>
<td></td>
<td>MARS 481</td>
<td>Seminar ¹</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>MARS 491</td>
<td>Research in Marine Sciences ¹</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MARS 625</td>
<td>GIS Use in Coastal Resources ⁵</td>
<td>3</td>
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<tr>
<td></td>
<td>MARS 676</td>
<td>Environmental Policy</td>
<td>3</td>
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<td>Semester Credit Hours</td>
<td>15</td>
<td></td>
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</tbody>
</table>

| Spring    | ECON 203 | Principles of Economics ⁵                         | 3            |
|           | MARS 604 | Marine Natural Resource Economics ⁵ ⁶             | 3            |
|           | MARS 603 | Quantitative Methods for Resource Management ¹ ⁶ | 3            |
|           | MARS 675 | Environmental Management Strategies ¹ ⁶           | 3            |
|           |              | Semester Credit Hours                            | 15           |

Total Semester Credit Hours: 96
Fifth Year

Fall

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MARS 635</td>
<td>Environmental Impact Statements and Natural Resource Damage Assessment</td>
<td>3</td>
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<tr>
<td>MARS 681</td>
<td>Seminar</td>
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<td>PLAN 641</td>
<td>Problems of Environmental Planning and Administration</td>
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<td>Professional elective</td>
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Total Semester Credit Hours 13

Spring

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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MARS 680</td>
<td>Integrative Analysis in Marine Resources</td>
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<tr>
<td>MARM elective</td>
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<td>6</td>
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</tbody>
</table>

Total Semester Credit Hours 11

The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements.

Students in the 5-year program will take 12 fewer undergraduate credit hours than the other OCRE students. Graduate courses taken in the fourth and fifth year will be counted as credit towards the OCRE degree.

The total undergraduate hours prior to entering the 5-year program is 101. After starting the 5-year program, 6 additional undergraduate hours will be taken for a total of 108 undergraduate hours. The total graduate credit hours is 36. Substituting 6 hours of MARM electives for one free and one professional elective and applying 6 hours of credit by exam results in a total of 150 hours. The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses.

Course adjustments will be allowed for 6 hours of undergraduate elective credit to use 6 hours of MARM elective credits.

1 Indicates required courses in the Ocean and Coastal Resources major. These courses will be used to compute the major GPR. Also, if any upper level MARS or OCNG elective courses are taken, they will be used in the major GPR.

2 Designated writing intensive course.

3 Field Experience may also be met with MARB 300 plus one credit hour of a field oriented lab course.

4 Recommended professional electives include but are not limited to: CHEM 316, CHEM 318, MARA 470, MARB 320, MARA 430, MARB 340, MARB 345, MARB 423, MARB 438, MARB 445, MARS 305, MARS 330, MARS 370/GEOG 370, MARS 410, MARS 415, MARS 432, MARS 435, MARS 440, MARS 484, MARS 485, MARS 491 or MARS 489.

5 Credit by exam for MARS 325 and ECON 203 will be awarded after successful completion of MARS 625 and MARA 604, respectively.

6 The 36-hour professional track curriculum is structured with 24 hours of required courses and 12 hours of optional elective courses. The required courses include a 1 hour seminar to be taken in the student’s first year, 8 hours of management, 3 hours of Geographic Information Systems (GIS), 6 hours of resource economics and statistical methods, and 6 hours of law/policy courses. The student in the professional track will choose electives for the remaining 12 credit hours. See MARM curriculum pages of the graduate catalog for additional requirements for the research track (thesis option) curriculum.

University Studies - BS, Oceans and One Health Concentration

Oceans and One Health is an interdisciplinary program that allows the student to explore human, animal or environmental health issues associated with the marine and coastal communities. Students may pursue this degree program as a pathway to Medical, Dental or Veterinary School or as a stand-alone degree to address any of a number of health-related issues that result from urbanization of coastal areas or increased development of marine environments. The curriculum is designed to be flexible so that students can choose their focus from the diverse list of concentration electives. It also is rigorous enough to provide students headed for professional or graduate school with a solid background in health-related disciplines and environmental sciences.

This concentration is housed in the Marine Sciences Department (p. 681).

Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Core Courses</td>
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<tr>
<td>OCGN 251</td>
<td>Oceanography and Oceanography Laboratory</td>
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<td>MARS 360</td>
<td>Biochemistry</td>
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<td>MARS 428</td>
<td>Coastal Development and Human Health</td>
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Select statistics from:

<table>
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<tr>
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<tbody>
<tr>
<td>MARB 303</td>
<td>Biostatistics</td>
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<tr>
<td>SCMT 303</td>
<td>Statistical Methods</td>
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<tr>
<td>STAT 201</td>
<td>Elementary Statistical Inference</td>
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<tr>
<td>STAT 303</td>
<td>Statistical Methods</td>
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Directed electives, select 10 credit hours from:

<table>
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<tbody>
<tr>
<td>BIOL 351</td>
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<tr>
<td>CHEM 383</td>
<td>Chemistry of Environmental Pollution</td>
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<tr>
<td>MARB 301</td>
<td>Genetics</td>
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<td>MARB 414</td>
<td>Toxicology</td>
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<td>MARB 430</td>
<td>Coastal Plant Ecology</td>
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<td>MARS 325</td>
<td>Introduction to GIS for Marine Sciences</td>
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<td>OCNG 420</td>
<td>Biological Oceanography</td>
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University and College Requirements

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<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics (p. 22)</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
Ocean and Coastal Resources - Minor

Students in other majors may establish a minor field of study in Ocean and Coastal Resources (OCRE) through the completion of at least 16 hours of coursework. The OCRE minor pairs well with majors in Marine Biology [link](http://catalog.tamu.edu/undergraduate/galveston/marine-biology-bs), Marine Fisheries [link](http://catalog.tamu.edu/undergraduate/galveston/marine-biology-marine-fisheries-bs), Maritime Studies [link](http://catalog.tamu.edu/undergraduate/galveston/liberal-studies/maritime-studies-bs), Maritime Administration [link](http://catalog.tamu.edu/undergraduate/galveston/liberal-studies/maritime-administration-bs) or Ocean Engineering [link](http://catalog.tamu.edu/undergraduate/engineering/ocean/ocean-engineering-bs). It can also be completed as one of the minors for a University Studies degree with concentrations in Marine Environmental Law and Policy [link](http://catalog.tamu.edu/undergraduate/liberal-studies/marine-environmental-law-policy-university-studies-bs) or Maritime Public Policy and Communication [link](http://catalog.tamu.edu/undergraduate/liberal-studies/maritime-public-policy-communication-university-studies-bs).

### Program Requirements

<table>
<thead>
<tr>
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<td>GEOL 104</td>
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<td>MARS 440</td>
<td>Chemical Oceanography</td>
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<td>Select from:</td>
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<td>3-7</td>
</tr>
</tbody>
</table>

The mission of the Maritime Administration Department is to educate leaders for roles in maritime commerce and service to society. We fulfill this mission by providing the highest quality instruction and curricula in our academic program; unique learning opportunities in marine and maritime industries and/or government organizations involved in coastal, marine and maritime activities; interacting with businesses, government and other organizations through the exchange of ideas and practices; disseminating knowledge through published research; and actively pursuing a collaborative and inclusive work environment.

### Faculty

- Baca, David R, Instructional Assistant Professor
  Maritime Administration
  PHD, Texas A&M University, 2006
  MLS, The University of Texas, 1993

- Baker, Robert K, Lecturer
  Maritime Administration
  MBA, University of Houston, 1983

- Boudreaux, Lowell A, Instructional Assistant Professor
  Maritime Administration
  MBA, Lamar University, 1996

- Conway, Steven M, Senior Lecturer
  Maritime Administration
  MA, Yale School of Management, 1982
  MS, University of Bridgeport, 1980

- Donelan, Michael B, Lecturer
  Maritime Administration
  MBA, Tulane University, 1981

- Fanning, Travis F, Lecturer
  Maritime Administration
  JD, Roger Williams University School of Law, 2005

- Fitzhugh, Thomas C, Lecturer
  Maritime Administration
  JD, The University of Texas School of Law, 1976

- Fossum, Michael E, Executive Professor
  Maritime Administration
  MS, University of Houston at Clear Lake, 1997
Maritime Administration - 5-Year Bachelor of Science/Master of Maritime Administration and Logistics

This program allows Maritime Administration (MARA) majors to enter the graduate program for a Master of Maritime Administration and Logistics at the beginning of their senior year, enabling students to receive their MARA undergraduate degree (B.S.) and a Master of Maritime Administration and Logistics (MMAL) graduate degree in five years.

Students admitted to the 5-year degree program will have completed 92 of the 120 hours of course work required to receive a bachelor's degree. These courses must include the specific prerequisites for a Bachelor of Science degree in Maritime Administration, as well as the required Texas A&M University core curriculum courses.

Maritime Administration majors who have at least a 3.00 GPA and who have taken all of their prerequisite courses and otherwise completed 92 hours by the fall of their fourth year will be eligible to apply for the 5-year program during their junior year. Applicants to the 5-year program will submit the same materials (including GMAT scores) as other MMAL applicants, and those whose records are judged to be competitive by the mid-January deadline will be admitted. Admission criteria will be the same as for other MMAL students.

Students who choose not to finish the MMAL degree after being admitted to the 5-year program may exit the program at any time. Completed MMAL courses will be applied to their bachelor's degree in Maritime Administration, as appropriate. Failure to complete the MMAL program will in no way impede their ability to attain a bachelor's degree in Maritime Administration when the requirements for that degree are completed. Those who pursue the joint program will receive both degrees upon completion of the entire 5-year program. Students will not graduate with a bachelor's degree in year four, but rather will earn both their Bachelor of Science and Master of Maritime Administration and Logistics at the end of year five.

Admitted students will be enrolled in Maritime Administration and Logistics graduate courses with an undergraduate classification (U4) during the fall of their fourth year and will be re-classified as degree seeking master's students (G7) upon completing 107 credit hours. This will normally occur at the beginning of the spring semester of year four. Students will take 9 fewer undergraduate credit hours. Graduate courses taken in the fifth year program will be counted double, as credit towards their MMAL degree and as substitutes for MARA and free electives required for the bachelor's degree.

Students will be required to complete 36 graduate hours. The graduate hours will include 7 core courses (21 credits) in economics, management, operations and logistics with 15 credit hours of electives. The electives will be chosen according to the interest of the student in either the Maritime Policy and Law track or the Shipping and Port Management track. Students will also take 21 hours of undergraduate level MARA electives that must include MARA 416 in order to satisfy the TAMU intensive writing requirement.
Program Requirements

<table>
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<tr>
<th>Code</th>
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<td>ACCT 230</td>
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<td>MARA 205</td>
<td>Introduction to Ships and Shipping</td>
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<td>MARA 440</td>
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<td>MARA 466</td>
<td>Strategic Management 3</td>
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<tr>
<td>MARA 624</td>
<td>Intermodal Transportation Operations 4</td>
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<td>MARA 627</td>
<td>Marketing of Transportation Services 4</td>
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<td><strong>MARA electives</strong></td>
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<td><strong>University and College Requirements</strong></td>
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<td>MATH 141</td>
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<td>MATH 142</td>
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<td>American National Government</td>
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<td>POLS 207</td>
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<td>Communication (p. 22)</td>
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<td>Life and physical sciences (p. 22)</td>
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<td>Language, philosophy and culture (p. 23)</td>
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<td>American history (p. 25)</td>
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<td>General electives 7</td>
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<td><strong>TOTAL SEMESTER CREDIT HOURS</strong></td>
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<td>MARA 610</td>
<td>International Strategic Planning and Implementation</td>
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<td>MARA 623</td>
<td>Economic Issues in Shipping</td>
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<td>MARA 624</td>
<td>Intermodal Transportation Operations 4</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Indicates required courses in the Maritime Administration major. These courses will be used to compute the major GPR. At the time of graduation, a MARA major must have a GPR of at least 2.25 in their major. A MARA major must achieve a grade of ‘C’ or better in ACCT 229, ACCT 230, ECON 202, ECON 203 and SCMT 303 as a graduation requirement. These courses may be repeated as necessary to meet this requirement, and the requirement applies to courses taken at TAMUG or offered for transfer from other institutions.

2. Satisfies the intensive writing requirement.

3. Credit by examination given for MARA 466.

4. Courses to be used to meet both Undergraduate and Graduate requirements.

5. Students are required to complete 18 credit hours of MARA electives. Students should choose from the following courses: ACCT 315, ACCT 316, ECON 311, ECON 323, ECON 452, MARA 342, MARA 401, MARA 402, MARA 416, MARA 424, MARA 435, MARA 450, MARA 460, MARA 470, MARA 475, MARA 484, MARA 485, MARA 489 MARA 491, MARA 493 and SCMT 336.

6. Students may satisfy the 9-credit hours of Life and Physical Science requirement through any combination of one, three or four credit hour courses.

7. Must have advisor approval (ENGL 103 and CAEN 001-003 are excluded).

8. Choose 15 credit hours from the following graduate level MMAL elective courses: MARA 604, MARA 616, MARA 640, MARA 650, MARA 652, MARA 658, MARA 660, MARA 670, MARA 672, MARA 673, MARA 684, MARA 685, MARA 689, MARA 691, MARA 619, MARA 620, MARA 640, MARA 660, MARA 676.

**TOTAL PROGRAM HOURS 156**

All electives must be chosen in consultation with, and approved by, the student’s academic advisor. Unless courses are specifically listed, see University Core Curriculum at http://core.tamu.edu/ for a listing of course options for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements.

The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses.

**Maritime Administration - BS**

The Maritime Administration undergraduate curriculum provides a solid background in the key areas of accounting, finance, marketing,
law, economics and mathematics that are critical for today’s business professional. These courses lay the foundation for more advanced courses in international trade, inland waterways management, brokerage and chartering, organizational behavior, transportation economics, port and terminal management and other areas related to the maritime industry.

International trade is expanding as a result of the general increase in world-wide economic and political stability and this trend is expected to increase, as major economies such as China and Russia participate more fully in world-wide economic growth. The great majority of this expanded trade will be carried by ship. As a result, activity in American ports is expected to more than double in the next 20 years, and some ports in the Gulf of Mexico are expected to see a tripling of port activity. Additionally, the next 40 years will see greatly expanded oil and gas production in the deep waters of the western Gulf of Mexico. Taken together, these forces are now and will continue to positively affect demand for trained maritime professionals ashore. Maritime Administration graduates are ideally poised to meet the increasing demand for well educated maritime professionals.

Additionally, qualified undergraduate students have the opportunity to earn a Bachelor of Science and a Master of Maritime Administration and Logistics (http://www.tamug.edu/mara/mmal) in five years time through the Department of Maritime Administration’s 3+2 program.

### Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<td><strong>MAJOR REQUIREMENTS</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td>ACCT 229</td>
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<td>ACCT 230</td>
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<td>ECON 203</td>
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<td>FINC 341</td>
<td>Business Finance</td>
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<td>MARA 205</td>
<td>Introduction to Ships and Shipping&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>MARA 212</td>
<td>Business Law</td>
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<td>Personnel Management</td>
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<td>MARA 421</td>
<td>Admiralty Law</td>
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<td>MARA 440</td>
<td>Global Economy and Enterprise Management&lt;sup&gt;7&lt;/sup&gt;</td>
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<td>MARA 466</td>
<td>Strategic Management&lt;sup&gt;3&lt;/sup&gt;</td>
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<td>MGMT 481</td>
<td>Seminar in Management</td>
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<td>MKTG 321</td>
<td>Marketing</td>
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<td>SCMT 303</td>
<td>Statistical Methods</td>
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<td>SCMT 364</td>
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<td><strong>UNIVERSITY REQUIREMENTS</strong></td>
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<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
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</table>

<sup>1</sup> Indicates required courses in the Maritime Administration major. These courses will be used to compute the major GPR. At the time of graduation, a MARA major must have a GPR of at least 2.25 in their major. A MARA major must achieve a grade of ‘C’ or better in ACCT 229, ACCT 230, ECON 202, ECON 203 and SCMT 303 as a graduation requirement. These courses may be repeated as necessary to meet this requirement, and the requirement applies to courses taken at TAMUG or offered for transfer from other institutions.

<sup>2</sup> Students must register for MARA 205 their first semester at Texas A&M University Galveston Campus.

<sup>3</sup> Designated writing intensive course.

<sup>4</sup> Students should select 18 hours from the following courses: ACCT 315, ACCT 316, ECON 311, ECON 323, ECON 452, MARA 342, MARA 401, MARA 402, MARA 416, MARA 424, MARA 435, MARA 450, MARA 460, MARA 470, MARA 475, MARA 484, MARA 485, MARA 489, MARA 491, MARA 493 and SCMT 336.

<sup>5</sup> Students may satisfy the 9-credit hours of Life and Physical Science requirement through any combination of one, three or four credit hour courses.

All electives must be chosen in consultation with, and approved by, the student’s academic advisor. Unless courses are specifically listed, see University Core Curriculum at http://core.tamu.edu/ for a listing of course options for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements.

The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses.

To earn the economics minor, the student’s elective hours must include ECON 311, ECON 323 and ECON 452. For additional requirements of the economics minor, please see the website: http://www.tamug.edu/academics/Minors.html.

### Maritime Administration - Minor

The Minor in Maritime Administration is designed to provide the student with fundamental knowledge in the business of water transportation. Students are required to complete 18 credit hours consisting of 12 hours of required coursework in general business and the maritime industry, and 6 credit hours from an approved list of maritime course electives.
Program Requirements

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<tr>
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<td>ACCT 229</td>
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<td>MARA 301</td>
<td>Ocean Transportation I</td>
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<td>MARA 416</td>
<td>Port Operations, Administration and Economics</td>
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¹ Select from: MARA 304, MARA 342, MARA 401, MARA 402, MARA 421, MARA 424, MARA 440, MARA 450, MARA 460, MARA 484, MARA 485, MARA 489, MARA 491 and MARA 493.

Department of Maritime Transportation

This program combines studies in the humanities and sciences with instruction and training in maritime disciplines to provide the U.S. Maritime Service Cadet with a broad-based education. The student who successfully completes the license program will be qualified to sit for the U.S. Coast Guard license examination as a Third Mate of any gross tonnage upon oceans, steam, or motor vessels and issuance of Standards of Training, Certification and Watchkeeping (STCW) credentials. Cadets are also provided with solid fundamentals in business topics related to the maritime industry, ashore and afloat. Cadets who enroll in and apply to graduate in Marine Transportation must successfully complete the license examination for Third Mate in order to graduate from Texas A&M University.

Courses earning USCG or STCW qualifications, sea-time remission or STCW competency certification require a minimum grade of C (70%). In addition, all STCW proficiencies must be satisfactorily completed with a grade of 70% or better (See applicable course outlines available through the department).

Faculty

Askins, Daniel A, Visiting Assistant Professor
Marine Transportation
CERT, United States Coast Guard, 2016
BS, Texas A&M University, 2001

Bourgeois, Peter J, Assistant Professor of the Practice
Marine Transportation
BS, U.S. Merchant Marine Academy, 1956
CERT, United States Coast Guard, 1956

Cleary, James P, Associate Professor of the Practice
Marine Transportation
MA, American Public University, 2011

Coonrod, James W, Lecturer
Marine Transportation
BS, Texas A&M University, 1967
CERT, United States Coast Guard, 1967

Fossati, Kate E, Lecturer
Marine Transportation
BS, Texas A&M University, 2011
CERT, United States Coast Guard, 2011

Luna, Amy V, Lecturer
Marine Transportation
BS, Texas A&M University, 2007
CERT, United States Coast Guard, 2007

McCright, Michael J, Lecturer
Marine Transportation
BS, Roger Williams University, 1994
CERT, United States Coast Guard, 1995

Nelick, Timothy F, Assistant Professor of the Practice
Marine Transportation
BS, Texas A&M University, 1987
CERT, United States Coast Guard, 1980

Orange, William R, Lecturer
Marine Transportation
BS, Texas A&M University, 1991

Putty, Scott, Associate Professor of the Practice
Marine Transportation
BS, Texas A&M University, 1979
CERT, United States Coast Guard, 1979

Roth, Augusta D, Associate Professor of the Practice
Marine Transportation
MBA, University of Phoenix, 2008
CERT, United States Coast Guard, 1996

Teare, Joseph, Lecturer
Marine Transportation
BS, Texas A&M University, 1967
CERT, US Costal Guard, 1967

Walling, Herbert M, Associate Professor of the Practice
Marine Transportation
MS, Main Maritime Academy, 1987
CERT, United States Coast Guard, 1971

Majors

• Bachelor of Science in Marine Transportation (p. 692)

Marine Transportation - BS

This program combines studies in the humanities and sciences with instruction and training in maritime disciplines to provide the U.S. Maritime Service Cadet with a broad-based education. The student who successfully completes the license program will be qualified to sit for the U.S. Coast Guard license examination as a Third Mate of any gross tonnage upon oceans, steam, or motor vessels and issuance of Standards of Training, Certification and Watchkeeping (STCW) credentials. Cadets are also provided with solid fundamentals in business topics related to the maritime industry, ashore and afloat. Cadets who enroll in and apply to graduate in Marine Transportation must successfully complete the license examination for Third Mate in order to graduate from Texas A&M University.

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addition, all STCW proficiencies must be satisfactorily completed with a grade of 70% or better (See applicable course outlines available through the department).

## Program Requirements

### First Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>HIST 232</td>
<td>History of American Sea Power</td>
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<tr>
<td>KINE 120</td>
<td>The Science of Basic Health and Fitness</td>
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<td>MART 103</td>
<td>Basic Safety and Lifeboatman Training</td>
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<td>MART 115</td>
<td>Seamanship I</td>
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<td>MATH 141</td>
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<td>NVSC 200</td>
<td>Naval Science for the Merchant Marine Officer</td>
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<td>Deck Sea Training I: Basic Communications, Navigation and Seamanship</td>
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#### Fall

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<tr>
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<td>MART 212</td>
<td>Marine Dry Cargo Operations</td>
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<td>MART 215</td>
<td>Seamanship II</td>
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<td>MART 303</td>
<td>Celestial Navigation</td>
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<td>PHYS 201</td>
<td>College Physics</td>
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<td></td>
<td>Semester Credit Hours</td>
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#### Spring

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<td>MART 202</td>
<td>Ship Stability and Trim</td>
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<td>MART 210</td>
<td>Integrated Navigation I: RADAR/ARPA/ECDIS</td>
<td>4</td>
</tr>
<tr>
<td>MART 321</td>
<td>Navigation Rules, International and Inland</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Communication (p. 22)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
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#### Summer

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MART 300</td>
<td>Deck Sea Training II: Intermediate Communications, Navigation and Seamanship</td>
<td>4</td>
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<td></td>
<td>Semester Credit Hours</td>
<td>4</td>
</tr>
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</table>

### Third Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>MART 208</td>
<td>Maritime Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>MART 307</td>
<td>Global Maritime Distress Safety System</td>
<td>3</td>
</tr>
<tr>
<td>MART 310</td>
<td>Integrated Navigation II: Electronic Navigation</td>
<td>2</td>
</tr>
<tr>
<td>MART 315</td>
<td>Seamanship III</td>
<td>2</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Creative arts (p. 24)</td>
<td></td>
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<td></td>
<td>Semester Credit Hours</td>
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#### Spring

<table>
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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ECON 203</td>
<td>Principles of Economics</td>
<td>3</td>
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<tr>
<td>MARA 301</td>
<td>Ocean Transportation I</td>
<td>3</td>
</tr>
<tr>
<td>MART 313</td>
<td>Marine Liquid Cargo Operations</td>
<td>3</td>
</tr>
<tr>
<td>MART 410</td>
<td>Integrated Navigation III: Bridge Watchstanding</td>
<td>2</td>
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<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
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#### Summer

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<th>Course</th>
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<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MART 400</td>
<td>Deck Sea Training III: Advanced Communications, Navigation and Seamanship</td>
<td>4</td>
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<td>Semester Credit Hours</td>
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### Fourth Year

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MARA 416</td>
<td>Port Operations, Administration and Economics</td>
<td>3</td>
</tr>
<tr>
<td>MART 403</td>
<td>Advanced Topics in Shipboard Operations</td>
<td>2</td>
</tr>
<tr>
<td>MART 404</td>
<td>The Navigator</td>
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<tr>
<td>MART 498</td>
<td>Maritime Medical Care</td>
<td>2</td>
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<tr>
<td></td>
<td>Field elective</td>
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<td></td>
<td>Semester Credit Hours</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MARA 421</td>
<td>Admiralty Law</td>
<td>3</td>
</tr>
<tr>
<td>MART 401</td>
<td>Maritime Security</td>
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<td></td>
<td>Field elective</td>
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<td>Semester Credit Hours</td>
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</table>

#### Total Semester Credit Hours

1 Indicated required courses in the Marine Transportation major. These courses will be used to compute the major GPR, which must be at least 2.25.

2 Indicates license courses leading to a USCG/STCW license endorsement or sea time credit accrual which require a minimum grade of C (70%) or better to earn the endorsement or accrual. Students will be required to repeat the course until they earn a grade of C (70%) or better. MART 307 GMDSS requires a score of 75% or better.

3 Indicates a course that satisfies the writing intensive course requirements of the university.

4 Approved Electives in Field include but are not limited to ACCT 229; MART 205, MART 213, MART 308, MART 311, MART 485, MART 489, MART 304, MART 342, MART 363, MART 401, MART 402, MART 424, MART 440, MART 450, MART 460.

5 MART 498 must be taken within one year of graduation to receive USCG approval.
* The total hours may be increased if the student is required to take remedial math, remedial English, foreign language or International and Cultural Diversity courses, or any of the six hour cruise options. The six hour cruise options (NAUT 200, NAUT 300 and NAUT 400 or MARR 200, MARR 300 and MARR 400) do not add any required hours to the degree plan.

All electives must be chosen in consultation with, and approved by, the student's academic advisor. Unless courses are specifically listed, see University Core Curriculum at http://core.tamu.edu/ for a listing of course options for Communication; Mathematics; Life and Physical Sciences; Language, Philosophy and Culture; Creative Arts; American History; Government and Political Sciences; and Social and Behavioral Sciences. The 6-hour University Core Curriculum requirement for International and Cultural Diversity may be met with courses used to satisfy other degree requirements.

MART students are required to earn a grade of C or better in all MART courses, including electives in field.
Texas A&M University Qatar Campus

Administrative Officers
Dean - César O. Malavé
Vice Dean - Eyad A. Masad
Associate Dean for Research and Executive Director of Development, Engagement and Outreach - Hassan S. Bazzi
Assistant Dean for Academic and Student Services - Troy Bickham
Assistant Dean for Finance and Administrative Services - Rosalie Nickles

General Statement
Texas A&M’s branch campus in Qatar, part of the 2.500-acre multi-institutional campus known as Education City formally opened on September 7, 2003, offering undergraduate degree programs in chemical, electrical, mechanical, and petroleum engineering. Texas A&M’s engineering program is widely considered among the best in America, and the curricula offered at the Qatar campus are materially the same as those offered at the main campus located in College Station, Texas. Texas A&M University Qatar campus is fully funded by the Qatar Foundation for Education, Science, and Community Development and provides a unique opportunity for the University to expand its international presence and provide educational and research opportunities for faculty and students.

Programs of Study at Texas A&M University Qatar Campus
Texas A&M University’s College of Engineering strives to provide its students with a high-quality education that will prepare them for a wide range of careers at the forefront of the engineering field. The curriculum is designed to accomplish this by closely integrating cutting-edge basic and applied research with innovative classroom instruction. Texas A&M University’s engineering programs are routinely ranked among the best in the U.S., and graduates are highly sought-after to provide leadership and innovative solutions to global challenges.

Our faculty members maintain active research programs in a wide range of areas. In addition, our undergraduate students participate in numerous co-op and internship programs, which give them the opportunity to apply their knowledge to real-world challenges in a variety of settings.

At Texas A&M University Qatar campus, engineering students take courses in the fundamental disciplines—mathematics, sciences, and liberal arts—that will prepare them for the rigorous technical training that follows. This training is dedicated to specialized studies in one of the four engineering fields offered at Texas A&M University Qatar campus. After completing intensive, demanding course work and practical experience, students are ready to step into their professional fields and make immediate, meaningful contributions.

Admission
The online application for undergraduate admission may be found at www.qatar.tamu.edu/apply. Additional information may be obtained by calling +974 (4423-0043), or by visiting the Office of Admissions at the Engineering Building located in Education City, Doha, Qatar. To be considered a candidate for admission to Texas A&M University Qatar campus, the prospective student must formally apply by submitting all of the required documents and test scores and meeting all of the admission requirements. Required documents may include the following:

1. Completed application
2. Passport copy (resident permit if required)
3. Official high school/secondary school transcript
4. Official college/university and/or Academic Bridge Program transcripts (if applicable)
5. Official test scores
6. Essay
7. Resume/Curriculum Vitae
8. Reference forms
9. Application fee

Facilities
The Texas A&M Qatar campus engineering building is one of the most advanced facilities for engineering education in the world. Designed by the famous father-son Mexican architect team Legoretta + Legoretta, the 55,000 square meter (592,000 square feet) facility combines modernist elements with traditional Islamic architectural motifs. The building is fully wireless and features high-tech classrooms, teaching laboratories and computer laboratories. The research rotunda provides additional research laboratories that give future Aggie engineers firsthand experience.

Texas A&M Qatar campus’s home in Education City also includes a library with a core professional collection of 10,000 titles and a number of journals and DVDs relating to the liberal arts, humanities, and basic sciences. Students also have access to books and journals from the libraries on the main campus, from collections that exceed 5 million volumes. Extensive online resources are available to students in the library and remotely, including more than 2 million electronic books and thousands of subscription electronic journals and databases.

Majors
Please visit the Texas A&M University Qatar Campus Catalog for more information.

Chemical Engineering Program
- Bachelor of Science in Chemical Engineering (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)

Electrical and Computer Engineering Program
- Bachelor of Science in Electrical Engineering (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)

Mechanical Engineering Program
- Bachelor of Science in Mechanical Engineering (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)

Petroleum Engineering Program
- Bachelor of Science in Petroleum Engineering (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)
Minors

Please visit the Texas A&M University Qatar Campus Catalog for more information.

- Chemical Engineering Minor (p. 363)
- Chemistry Minor (p. 612)
- Electrical Engineering Minor (p. 391)
- Geology Minor (p. 458)
- Mathematics Minor (p. 634)
- Mechanical Engineering Minor (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)
- Petroleum Engineering Minor (p. 421)
- Political Science Minor (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)

Certificates

Please visit the Texas A&M University Qatar Campus Catalog for more information.

- Engineering Systems Management Certificate (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)

Masters

Please visit the Texas A&M University Qatar Campus Catalog for more information.

Chemical Engineering Program

- Master of Engineering in Chemical Engineering (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)
- Master of Science in Chemical Engineering (https://www.qatar.tamu.edu/students/office-of-records/university-catalog)
COURSE DESCRIPTIONS

All undergraduate courses offered in the University are described on each subject page. The course numbering scheme is as follows: 100–199, primarily open to freshmen; 200–299, primarily open to sophomores; 300–399, primarily open to juniors; and 400–499, primarily open to seniors.

Figures in parenthesis before the course description indicate the Texas Common Course Number(s). The unit of credit is the semester hour, which involves one hour of theory or from two to four hours of practice per week for one semester of 15 weeks. Figures following the credit hours indicate the clock hours per week devoted to theory and practice, respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room, field or other. When courses are cross-listed, credit cannot be received for both courses. Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify offering the course.

Field trips may be required for which departmental fees may be assessed to cover costs.

AALO - Arabic & Asian Language (AALO)

AALO 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects in an Asian Language, selected for each student individually; written or oral reports. Prerequisite: Approval of Arabic and Asian Language Office Director.

AALO 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of an Asian language. May be repeated for credit. Prerequisite: Approval of Arabic and Asian Language Office Director.

AALO 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects selected for each student individually; written or oral reports. Prerequisite: Approval of Arabic and Asian Language Office Director.

AALO 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of an Asian language. May be repeated for credit. Prerequisite: Approval of Arabic and Asian Language Office Director.

ACCT - Accounting (ACCT)

ACCT 209 Survey of Accounting Principles
Credits 3. 3 Lecture Hours.
Accounting survey for non-business majors; non-technical accounting procedures, preparation and interpretation of financial statements and internal control. May not be used to satisfy degree requirements for majors in business. Business majors who choose to take this course must do so on a satisfactory/unsatisfactory basis.

ACCT 210 Survey of Managerial and Cost Accounting Principles
Credits 3. 3 Lecture Hours.
A survey of managerial and cost accounting for non-business majors; accounting responsibility of the manager, job and process cost systems, budgeting, cost-volume-profit analysis for decision-making. May not be used to satisfy degree requirements for majors in business. Business majors who choose to take this course must do so on a satisfactory/unsatisfactory basis. Prerequisite: ACCT 209.

ACCT 229 Introductory Accounting
Credits 3. 3 Lecture Hours.
(ACCT 2301, 2401) Introductory Accounting. Analysis, recording and reporting of business transactions; partnership and corporation accounting; analysis and use of financial statements. Prerequisite: Sophomore classification.

ACCT 230 Introductory Accounting
Credits 3. 3 Lecture Hours.
(ACCT 2302, 2402) Introductory Accounting. Continuation of ACCT 229. Use of budgets; introduction to cost accounting; cost control techniques and methods of measuring performance. Prerequisites: ACCT 229 and sophomore classification.

ACCT 315 Intermediate Accounting for Non-Accounting Majors I
Credits 3. 3 Lecture Hours.
Revenue recognition, principles of asset valuation, and disclosure requirements for corporations; interpretation of financial statements, rather than their preparation. May not be used as a directed or free elective for accounting majors and does not count towards the accounting requirement for the CPA exam. Prerequisites: ACCT 230 and admission to upper division in Mays Business School.

ACCT 316 Intermediate Accounting for Non-Accounting Majors II
Credits 3. 3 Lecture Hours.
Includes the measurement and disclosure requirements for liabilities and stockholders' equity, SEC registration statements, and cash flow reporting; focus on the analysis and interpretation of financial statements rather than their preparation. Does not qualify as a directed or free elective for accounting majors and does not count towards the accounting requirement for the CPA exam. Prerequisites: ACCT 315 or ACCT 327.

ACCT 320 Accounting Communications
Credits 3. 3 Lecture Hours.
Development of oral and written communication skills necessary for successful careers in public and corporate accounting. Prerequisite: Admission to Professional Program.

ACCT 321 Professional Development Seminar
Credits 2. 2 Lecture Hours.
Exposure to professional issues of professional accounting practice using a workshop format. Prerequisite: Admission to Professional Program.

ACCT 322 Professional Development Seminar – BBA
Credit 1. 1 Lecture Hour.
Exposure to professional issues in the practice of accounting, including potential careers and employers. Prerequisite: ACCT 327 with a grade of C or better.
ACCT 327 Financial Reporting I
Credits 3. 3 Lecture Hours.
Study of theoretical basis for financial accounting concepts and principles related to financial reporting; emphasizing income measurement and accounting for assets. BBA accounting majors must earn a minimum grade of C for graduation.
Prerequisite: ACCT 230 and admission to upper division in Mays Business School.

ACCT 328 Financial Reporting II
Credits 3. 3 Lecture Hours.
Continued study of accounting concepts and principles related to reporting long-debt and owners’ equity; including reporting issues of leases, retirement benefits, income taxes and international accounting standards.
Prerequisite: ACCT 327 with a grade of C or better.

ACCT 329 Cost Management and Analysis
Credits 3. 3 Lecture Hours.
Theory, concepts and methods relating to use of information and design of systems to aid managers in planning, controlling, decision making, evaluating performance and reporting financial results.
Prerequisite: ACCT 315 or ACCT 327 with a grade of C or better.

ACCT 403 Energy Accounting
Credits 3. 3 Lecture Hours.
Overview of the oil and gas industry and specialized financial accounting procedures associated with the industry; emphasis on accounting for exploration, development, production, depletion and amortization, joint operations, asset impairment and retirement obligation; includes reserve accounting/disclosure related to the above topics.
Prerequisite: ACCT 327 with C or better.

ACCT 405 Income Tax
Credits 3. 3 Lecture Hours.
Introduction to federal income tax legislation pertaining primarily to corporations and individuals.
Prerequisite: ACCT 327 with a grade of C or better.

ACCT 407 Auditing
Credits 3. 3 Lecture Hours.
Introduction to auditing theory and procedures pertaining to financial statements, in the context of both external auditing, by certified public accountants, and internal auditing; preparation of working papers.
Prerequisite: ACCT 327 with a grade of C or better.

ACCT 408 Internal Auditing
Credits 3. 3 Lecture Hours.
Reading and evaluation of current theory and procedures used by internal auditors; selected case studies; statistical methods of forming auditing judgment.
Prerequisite: ACCT 327 with a grade of C or better.

ACCT 410 Fraud Examination
Credits 3. 3 Lecture Hours.
Principles and methodologies of detecting and deterring fraud using accounting, auditing, and investigative skills; includes skimming, larceny, misappropriations, fraudulent statements, interviewing witnesses and support for litigation.
Prerequisites: ACCT 327 with a grade of C or better; junior or senior classification.

ACCT 411 Critical Communication Skills for Accountants
Credits 2. 2 Lecture Hours.
Development of oral and written communication skills necessary for successful careers in public and corporate accounting.
Prerequisite: ACCT 327 with a grade of C or better.

ACCT 425 Corporate Tax Planning
Credits 3. 3 Lecture Hours.
Integration of tax regulations into overall corporate finance planning and decision making cycle.
Prerequisite: ACCT 405.

ACCT 426 Taxation of Low-Income Filers
Credits 3. 3 Lecture Hours.
Overview of the Federal income tax and its impact on low-income filers; includes socio-economic forces impacting low-income families and individuals; topics explored through community service and academic learning.
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

ACCT 427 Accounting and Financial Information Systems
Credits 3. 3 Lecture Hours.
Overall data flow systems emphasizing financial data and computerized systems, for accounting majors; flow and logic concepts, developing meaningful control concepts and data reporting techniques.
Prerequisite: ACCT 327 with a grade of C or better.

ACCT 430 Global Immersion in Accounting
Credits 3. 3 Lecture Hours.
Combination of classroom work in the spring and a field trip to the selected country in summer; introduction to international opportunities within the public accounting firms; meet with former students to gain a local and corporate view of business in the selected country.
Prerequisites: ACCT 327 and approval of instructor.
Cross Listing: IBUS 430.

ACCT 445/IBUS 445 International Accounting
Credits 3. 3 Lecture Hours.
Introduction and examination of accounting issues unique to multinational enterprises and international business activity.
Prerequisites: ACCT 315 or ACCT 327; FINC 341.

ACCT 447/FINC 447 Financial Statement Analysis
Credits 3. 3 Lecture Hours.
Development of an analytical approach to financial statements, integrating relevant finance and accounting concepts and principles; current topics in financial analysis.
Prerequisites: ACCT 315 or ACCT 327; FINC 341 with a grade of C or better.
Cross Listing: FINC 447/ACCT 447.

ACCT 450 Accounting Ethics
Credits 3. 3 Lecture Hours.
Integration of ethical reasoning, objectivity, independence and other core values into the development of a professional accountant; critical analysis of the ethical lapses which have occurred in business and the accounting profession; exploring ways to integrate ethical behavior into professional life.
Prerequisites: ACCT 328; junior or senior classification.
AERO 201 Introduction to Flight
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Standard atmosphere; basic aerodynamic theory; isentropic flow; airfoil and wing descriptions; distributed load systems; static equilibrium; free body diagrams; wing structures; elementary aerospace vehicle performance; aircraft stability and control; experiential introduction to aerospace engineering.
Prerequisites: Admitted to major degree sequence in aerospace engineering; grade of C or better in ENGR 111, MATH 151, MATH 152, PHYS 218; grade of C or better in MATH 251 or MATH 253 or registration therein.

AERO 202 Introduction to Flight Mechanics
Credit 1. 1 Lecture Hour.
Introductory material in aerospace engineering; development of standard atmosphere; aerodynamic theory; airfoil and wing descriptions; aircraft performance.
Prerequisites: Admitted to major degree sequence in aerospace engineering; MEEN 221 or equivalent; MATH 251 or MATH 253 or concurrent enrollment.

AERIAL 210 Introduction to Aerospace Mechanics
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Planar kinematics; fundamentals of Newtonian mechanics; system of particles and rigid bodies; the effect of friction forces on motion and static equilibrium; rectilinear and curvilinear motion of particles; translational momentum; moments of inertia; angular momentum; planar motion of rigid bodies; impact dynamics; situations involving variable mass; introduction to orbital mechanics.
Prerequisites: Grade of C or better AERO 201; grade of C or better in MATH 308 or registration therein.

AERO 212 Introduction to Aerothermodynamics
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Study of thermodynamic properties and processes, heat and work, first and second laws of thermodynamics, power and refrigeration ideal cycles, psychrometrics.
Prerequisites: Grade of C or better in CHEM 107 and CHEM 117; grade of C or better in MATH 251, or concurrent enrollment.

AERO 214 Introduction to Aerospace Mechanics of Materials
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamental concepts for deformable bodies (conservation of linear and angular momentum, kinematics and thermoelasticity); notions of stress and strain and illustrative examples for engineering applications; introduction to experimental methods and reporting, instrumentation and uncertainty analysis; measurement of elastic and thermal material properties.
Prerequisites: Grade of C or better in AERO 201; grade of C or better in MATH 308, or concurrent enrollment.

AERO 220 Introduction to Aerospace Computation
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Review of basic skills required for developing computer programs and introduction to more advanced concepts in scientific computing to solve aerospace engineering problems; numerical and analytical methods of solving engineering problems involving curve fitting; interpolation and extrapolation; difference operators and differentiation; integration; solutions to linear and non-linear equations and differential equations with engineering applications.
Prerequisites: Grade of C or better in ENGR 112; grade of C or better in MATH 308 or concurrent enrollment.

AERO 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of aerospace engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

AERO 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in aerospace engineering. May be taken three times.
Prerequisites: Freshman or sophomore classification and approval of instructor.

AERO 299 Mid-Curriculum Professional Development
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.
AERO 301 Theoretical Aerodynamics  
Credits 3. 3 Lecture Hours.  
Fundamentals of incompressible flow, conservation principles, continuity,  
momentum, rotationality, circulation, lift, drag, potential flow, thin airfoil  
theory, panel methods, airfoil design, high lift devices, finite wing theory,  
vortex lattice methods, and wing design.  
Prerequisites: Grade of C or better in AERO 201, AERO 212, AERO 220 and  
MATH 308.

AERO 302 Aerospace Engineering Laboratory  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Intermediate and advanced topics in instrumentation, signal conditioning,  
data acquisition analysis for aerospace-related measurements; emphasis  
on technical reporting and data presentation; measurements of  
materials stress, deformation, pressure, velocity and aerodynamic forces;  
experimental investigations of static and dynamic response of structures;  
use of nonintrusive optical techniques; uncertainty analysis; linear  
regression, Fourier transform and power spectra; tests for statistical  
significance.  
Prerequisites: Grade of C or better in ENGL 104; grade of C or better in  
AERO 301, AERO 304, AERO 310, ECEN 215, or registration therein.

AERO 303 High Speed Aerodynamics  
Credits 3. 3 Lecture Hours.  
Fundamentals of compressible flow, acoustic waves, shock and  
expansion waves, shock-expansion theory, supersonic airfoil design,  
small perturbation theory, conical flow theory, supersonic wing panel  
methods, supersonic wing design, similarity theory, cone flow, unsteady  
waves, and theory of characteristics.  
Prerequisite: Grade of C or better in AERO 301.

AERO 304 Aerospace Structural Analysis I  
Credits 3. 3 Lecture Hours.  
Structural design considerations; mechanics of structures; introduction  
to elasticity; constitution of materials; analysis of typical aerospace  
structures in bending, extension, torsion and shear.  
Prerequisites: Grade of C or better in AERO 214, AERO 220, MATH 308.

AERO 306 Structural Analysis II  
Credits 3. 3 Lecture Hours.  
Work and energy principles; analysis of indeterminate structures by  
classical virtual work and finite elements; introduction to elastic stability  
of columns; application of energy methods to determine stresses,  
strains and displacements in typical aerospace structures; design  
considerations in aerospace structures.  
Prerequisite: Grade of C or better in AERO 304.

AERO 310 Aerospace Dynamics  
Credits 3. 3 Lecture Hours.  
Spatial kinematics; general motion of particles; Euler angles; Newton-  
Euler methods for translation and rotation of rigid bodies; work-energy  
and impulse momentum principles applied to aerospace systems; Linear  
theory of free and forced vibrations and dynamic response of single and  
multi-degree of freedom systems; frequency response of first and second  
order systems with instrumentation applications.  
Prerequisites: Grade of C or better in AERO 210, AERO 220 and  
MATH 308.

AERO 311 Advanced Analysis Techniques  
Credits 3. 3 Lecture Hours.  
Continuation of AERO 413. System optimization by examination and  
analysis of necessary trade-offs.  
Prerequisite: Grade of C or better in AERO 413.

AERO 312 Advanced Experimental Techniques  
Credits 3. 3 Lecture Hours.  
Aerodynamic design, specification, arrangement, performance analysis,  
weight and balance, stability.  
Prerequisites: Grade of C or better in AERO 303, AERO 306, AERO 321 and  
AERO 351; AERO 302 or concurrent enrollment.

AERO 313 Advanced Numerical Techniques  
Credits 3. 3 Lecture Hours.  
Continuation of AERO 312.  
Continuation of AERO 413. System optimization by examination and  
analysis of necessary trade-offs.  
Prerequisite: Grade of C or better in AERO 413.

AERO 314 Advanced Structural Analysis  
Credits 3. 3 Lecture Hours.  
Continuation of AERO 404.  
Overall structural integrity of complete aerospace systems; structures  
subjected to critical loads; design considerations in aerospace  
structures.  
Prerequisite: Grade of C or better in AERO 306.

AERO 315 Advanced Polymer Nanocomposites  
Credits 3. 3 Lecture Hours.  
Advanced analysis techniques for aerospace structures; material  
anisotropy, plasticity, fatigue and fracture; laminated materials; solution  
of plane elasticity, plate and multi-component structural configurations;  
buckling of beams and plates; application of finite element analysis.  
Prerequisites: Grade of C or better in AERO 304 and junior or senior  
classification.

AERO 316 Advanced Aerothermodynamics  
Credits 3. 3 Lecture Hours.  
Aerothermodynamics of gases; laws of thermodynamics; equilibrium  
conditions; mixtures of gases; combustion and thermochemistry;  
compressible internal flows with friction, heat transfer and shock;  
turbojet cycle analysis and performance; chemical rockets.  
Prerequisite: Junior or senior classification or approval of instructor.

AERO 317 Advanced Fluid Dynamics  
Credits 3. 3 Lecture Hours.  
Continuation of AERO 316. System optimization by examination and  
analysis of necessary trade-offs.  
Prerequisite: Grade of C or better in AERO 401.

AERO 318 Advanced Experimental Methods  
Credits 3. 3 Lecture Hours.  
Recent advances and methodologies in processing and characterization  
of nanostructured polymers and nanocomposites, as well as their  
commercial applications; investigate polymers filled with nanometer-  
scale reinforcements, including nanoparticles, nanotubes, nanofibers, and  
nanoclays; macroscale, microscale and nanoscale characterizations  
investigated in relation to properties of interest.  
Prerequisites: Grade of C or better in AERO 413.

AERO 319 Advanced Fracture Mechanics  
Credits 3. 3 Lecture Hours.  
Foundations of linear elastic fracture mechanics of aerospace structure;  
calculation of stress intensity factors and energy release rates; crack  
growth under fatigue loading; ASTM standards for fracture testing;  
the role of fracture mechanics in the analysis and design of aerospace  
structures.  
Prerequisite: AERO 304 or equivalent with a grade of C or better.
AERO 413 Aerospace Materials Science  
Credits 3. 3 Lecture Hours.  
Relationship between aerospace engineering material properties and microstructure; mechanical and thermal properties; environmental degradation; mechanical failure.  
Prerequisite: Grade of C or better in AERO 304.

AERO 417 Aerospace Propulsion  
Credits 3. 3 Lecture Hours.  
Air breathing propulsion; design and analysis of inlets, compressors, combustors, turbines and nozzles; application to aeronautical and ground transportation.  
Prerequisite: Grade of C or better in AERO 351.

AERO 419 Chemical Rocket Propulsion  
Credits 3. 3 Lecture Hours.  
Nozzles and heat transfer in rockets, liquid and solid propellant systems; combustion and combustion stability; flight performance including trajectories, multistaging and exchange rate curves; rocket testing.  
Prerequisite: Grade of C or better in AERO 351.

AERO 420 Aeroelasticity  
Credits 3. 3 Lecture Hours.  
Classical analysis of fundamental aeroelastic phenomena with application to aerospace vehicles; flutter, divergence, control effectiveness.  
Prerequisites: Grade of C or better in AERO 303, AERO 306, AERO 310.

AERO 422 Active Controls for Aerospace Vehicles  
Credits 3. 3 Lecture Hours.  
Introduction to the Theory of Automatic Control specifically applied to aerospace vehicles; techniques for analysis and synthesis of linear control systems, stability criteria, systems response and performance criteria; design studies of active controls to improve aerospace vehicle performance.  
Prerequisite: Grade of C or better in AERO 321.

AERO 423 Orbital Mechanics  
Credits 3. 3 Lecture Hours.  
Rocket fundamentals; trajectories including aerodynamics, gravity turn and trajectory optimization, orbital mechanics, orbit lifetimes, three-body problem, orbit perturbations.  
Prerequisite: Grade of C or better in AERO 310.

AERO 424 Spacecraft Attitude Dynamics and Control  
Credits 3. 3 Lecture Hours.  
Introduces fundamental concepts of satellite attitude dynamics and control; includes derivations of environmental disturbances due to gravity gradient, aerodynamic, and solar radiation pressure; includes treatments of attitude control subsystems, such as thrusters, reaction wheels, CMGs, and magnetic torquers, and their designs.  
Prerequisites: Grade of C or better in AERO 321.

AERO 425 Flight Test Engineering  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Application of performance and stability and control theory to flight test measurements; standard atmosphere and airspeed equations for pilot-static system calibrations; flight test methods for evaluating performance, stability and control, and stall-spin characteristics; laboratory practice in planning and conducting small flight test project.  
Prerequisite: Grade of C or better in AERO 321.

AERO 426 Space System Design  
Credits 3. 3 Lecture Hours.  
Introduces prevailing practices and processes used in modern space system design; applies knowledge in component engineering disciplines to a design challenge of interest to NASA or DoD; utilizes instruction in systematic methods of design and on dynamics of teamwork; when possible concludes with detailed design using an engineering design facility.  
Prerequisites: Grade of C or better in AERO 306, AERO 321, AERO 351.

AERO 428 Electromagnetic Sensing for Space-Borne Imaging  
Credits 3. 3 Lecture Hours.  
Study IR and Visible range imaging systems to obtain high resolution imaging of objects from space; this area has numerous applications and areas of advanced development; following instruction in needed background on optics, telescopes, and interferometry, perform preliminary design of imaging system with a different imaging design offered each year.  
Prerequisites: Grade of C or better in AERO 306, AERO 321, AERO 351.

AERO 430 Numerical Simulation  
Credits 3. 3 Lecture Hours.  
Numerical and analytical simulation of physical problems in sciences and engineering using applied methods; developing and using numerical techniques for physical problems described by nonlinear algebraic equations, ordinary and partial differential equations.  
Prerequisite: Grade of C or better in AERO 220 or MATH 417.

AERO 435 Aerothermochemistry  
Credits 3. 3 Lecture Hours.  
Composition of chemically reacting gases (air and propellant); thermodynamic functions based on classical and quantum mechanical theories; calculation of gas temperatures; equilibrium, frozen and non-equilibrium flows through nozzles and shock waves.  
Prerequisite: Grade of C or better in AERO 303.

AERO 440 Cockpit Systems and Displays  
Credits 3. 3 Lecture Hours.  
Design, development, and implementation of cockpit systems and multifunction displays; cockpit system requirements and specifications; human-machine interfaces, Flight Management Systems, navigation and guidance systems; 3-D real-time displays of weather, traffic, and terrain; characteristics and missions of air vehicles; project design and cost analysis.  
Prerequisite: Grade of C or better in AERO 321 or junior or senior classification in computer science.

AERO 445 Vehicle Management Systems  
Credits 3. 3 Lecture Hours.  
Introduction to vehicle management systems for manned and unmanned air and space vehicles; system centric concepts, requirements definition, specifications, and architectures; reliability analysis, health monitoring, and mission management; SISO digital design of integrated flight control, propulsion control and structural control; introduction to vehicle autonomy; design and analysis methods, industrial examples.  
Prerequisite: Grade of C or better in AERO 422.
AERO 451 Human Spaceflight Operations  
Credits 3. 3 Lecture Hours.  
Essential aspects of human spaceflight operations as performed by NASA; in-depth understanding of the state-of-the-art in spacecraft operations, including spacecraft systems, ground and launch operations, mission management and on-orbit activities such as science, robotics, spacewalking and human health maintenance; applications to future space systems.  
Prerequisite: Grade of C or better in AERO 321 or equivalent; senior classification.

AERO 452 Heat Transfer and Viscous Flows  
Credits 3. 3 Lecture Hours.  
Navier-Stokes and boundary layer equations; exact and approximate solutions; laminar boundary layers; origin of turbulence; transition; turbulent boundary layers; viscous airfoil design; one and two dimensional heat transfer; methods for steady and transient heat conduction; thermal boundary layers; convection; and radiation.  
Prerequisite: Grade of C or better in AERO 351.

AERO 472 Airfoil and Wing Design  
Credits 3. 3 Lecture Hours.  
Subsonic airfoil design and analysis, subsonic wing design and analysis, swept and delta wings, vortex lift, transonic flow methods, viscous transonic phenomena, transonic airfoil and wing design, supersonic panel methods, supersonic wing design, optimization.  
Prerequisite: Grade of C or better in AERO 303.

AERO 481 Seminar  
Credit 1. 1 Lecture Hour.  
Readings, reports, conferences and discussion. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisite: Senior classification in aerospace engineering.

AERO 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Special problems in aerospace engineering assigned to individual students or groups.  
Prerequisite: Junior or senior classification or approval of instructor.

AERO 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified field of aerospace engineering. May be repeated for credit.  
Prerequisite: Approval of instructor.

AERO 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in aerospace engineering. May be repeated 3 times for credit.  
Prerequisites: Junior or senior classification and approval of instructor.

AERS - Aerospace Studies (AERS)

AERS 101 Foundations of the USAF  
Credit 1. 1 Lecture Hour.  
Introduction to the U.S. Air Force and the Air Force Reserve Officer Training Corps (AFROTC); includes Officership, professionalism, military customs and courtesies, and officer opportunities and benefits; AFROTC cadets must register for Leadership Laboratory (AERS 105) as it complements this course with followership experience.

AERS 102 Foundations of the USAF  
Credit 1. 1 Lecture Hour.  
Continuation of AERS 101; AFROTC cadets must register for Leadership Laboratory (AERS 106) as it complements this course with followership experience.

AERS 104 National Security Affairs—Preparation for Active Duty  
Credits 3. 3 Lecture Hours.  
National Security Affairs—Preparation for Active Duty. Continuation of AERS 103; Air Force contract individuals (or those seeking a contract) must register for Leadership Lab (AERS 106).  
Prerequisite: Non-Air Force contract students must have approval of instructor and department head.
AFST 201 Introduction to Africana Studies
Credits 3. 3 Lecture Hours.
Introduction to the field of Africana Studies; interdisciplinary approach
drawing from history, philosophy, sociology, political studies, literature
and performance studies; explores the African foundational relationship
to and connections with its diaspora populations; covers Africa, the
United States, the Caribbean, Europe and South America.

AFST 204/ENGL 204 Introduction to African-American Literature
Credits 3. 3 Lecture Hours.
Introduction to the writings of African Americans from the 18th century to
the present, emphasizing the major themes and traditions.
Cross Listing: ENGL 204/AFST 204.

AFST 205/ENGL 205 Introduction to African Literature
Credits 3. 3 Lecture Hours.
Works, literary movements and genres of authors of African descent in
the Americas, Europe and Africa.
Cross Listing: ENGL 205/AFST 205.

AFST 206/PSYC 206 Black Psychology
Credits 3. 3 Lecture Hours.
Critical examination of psychological experience, theories, and methods
from perspectives grounded in the "Black experience."
Cross Listing: PSYC 206/AFST 206.

AFST 208/PSYC 208 Stereotypes, Prejudice, and Minority Experience
Credits 3. 3 Lecture Hours.
Overview of theory and research relating to stereotyping, prejudice,
discrimination, and minority experiences from a social psychological
perspective.
Prerequisite: PSYC 107.
Cross Listing: PSYC 208/AFST 208.

AFST 209/PSYC 209 Psychology of Culture and Diversity
Credits 3. 3 Lecture Hours.
Introduction to various issues surrounding an increasingly
interconnected and globalized world by critically examining the dynamic
relationship between psychological processes and diverse (e.g.,
motivation, memory, self, prejudice) socio-cultural contexts.
Prerequisite: PSYC 107.
Cross Listing: PSYC 209/AFST 209.

AFST 252/PHIL 252 Introduction to Hip-Hop Philosophy
Credits 3. 3 Lecture Hours.
Introduction to philosophy by way of the major themes and subjects of
Hip-Hop; critical advocacy of various philosophical ideals.
Cross Listing: PHIL 252/AFST 252.

AFST 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed studies in the field of Africana Studies. May be taken two times
for credit.
Prerequisite: Freshman or sophomore classification; approval of
instructor and director.

AFST 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in Africana Studies. May be repeated for credit.

AFST 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in Africana
Studies. May be taken three times for credit.
Prerequisite: 6 credits of AFST; freshman or sophomore classification
and approval of instructor.

AFST 300/HIST 300 Blacks in the United States, 1607-1877
Credits 3. 3 Lecture Hours.
Blacks in the United States from the colonial period to 1877; the
slave trade, slavery, free blacks and the impact of the Civil War and
Reconstruction on blacks.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 300/AFST 300.

AFST 301/HIST 301 Blacks in the United States Since 1877
Credits 3. 3 Lecture Hours.
Blacks in the United States from the end of Reconstruction to the
present; ideologies of black leaders, disfranchisement, lynching and the
quest for equality in the 1950s and 1960s.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 301/AFST 301.

AFST 302 Gateway Course
Credits 3. 3 Lecture Hours.
Gateway to a series of courses offered for the minor in Africana Studies;
exploring topics such as Afrocentrism, postcolonial studies, black cultural
studies, black feminist theory for a close study of issues among African
and African diaspora populations in Africa, the United States, Caribbean,
Europe and South America.

AFST 303 Psychology of Women of Color
Credits 3. 3 Lecture Hours.
Interdisciplinary theories to study the unique yet intersectional
experiences of women from different racial groups, ethnicities,
nationalities and cultural backgrounds; scholarly research from the
diversity science field; contemporary topics that have developed in a
global context; examination of complex issues, which affect women of
color across the lifespan.
Prerequisite: Grade of C or better in AFST 201 or PSYC 107 or WGST 200,
or approval of instructor.
Cross Listing: PSYC 303 and WGST 303.

AFST 317/SOCI 317 Racial and Ethnic Relations
Credits 3. 3 Lecture Hours.
Status of racial and ethnic groups such as Native Americans, African
Americans, Latino Americans, Asian Americans, European Americans,
and other groups in the political, economic, legal and social systems of
the United States.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: SOCI 317/AFST 317.

AFST 323/SOCI 323 Sociology of African Americans
Credits 3. 3 Lecture Hours.
Major elements of the Afro-American subculture in relation to white
American society and its major social institutions.
Prerequisites: SOCI 205; junior or senior classification or approval of
instructor.
Cross Listing: SOCI 323/AFST 323.
AFST 324 Africana Social Sciences
Credits 3. 3 Lecture Hours.
Exploration of a significant topic pertaining to Africa and/or its diaspora in the social sciences.
Prerequisite: Junior or senior classification.

AFST 325 Africana Humanities
Credits 3. 3 Lecture Hours.
Exploration of a significant topic pertaining to Africa and/or its Diaspora in the humanities and arts.
Prerequisite: Junior or senior classification.

AFST 326 Africana Popular Culture
Credits 3. 3 Lecture Hours.
Dynamics of popular culture and classic theories of society; popular and public cultural forms in context of globalization and the Africana Diaspora.
Prerequisite: Junior or senior classification or approval of instructor.

AFST 327 Popular Musics in the African Diaspora
Credits 3. 3 Lecture Hours.
Examination of a range of popular musics from the twentieth century that have emerged in conjunction with the historical global spread of peoples and cultures from the African continent; technical knowledge about music is not required; focus on social and cultural contexts for popular music.
Prerequisite: Junior or senior classification or approval of instructor.

AFST 329/ENGL 329 African-American Literature Pre-1930
Credits 3. 3 Lecture Hours.
Major works of the African-American literary tradition from the 18th century to 1930 studied within cultural and historical context.
Prerequisites: 3 credits of literature at 200-level or above.

AFST 339/ENGL 339 African-American Literature Post-1930
Credits 3. 3 Lecture Hours.
Major works of the African-American literary tradition from the 1930s to the present studied in their cultural and historical context.
Prerequisites: 3 credits of literature at 200-level or above.

AFST 344/HIST 344 History of Africa to 1800
Credits 3. 3 Lecture Hours.
Origins of humankind in Africa; development and spread of pastoralism, agriculture and iron-working; formation of states and empires; impact of Christianity and Islam; rise of international trade in gold, ivory and slaves; African diaspora.
Prerequisite: Junior or senior classification.

AFST 345/HIST 345 Modern Africa
Credits 3. 3 Lecture Hours.
Survey of Africa since 1800; pre-colonial African states and societies; establishment and impact of European colonial rule; rise of nationalist movements; achievement of independence; problems of political stability and economic development in contemporary Africa; South Africa’s apartheid regime and its opponents.
Prerequisite: Junior or senior classification.

AFST 346/HIST 346 History of South Africa
Credits 3. 3 Lecture Hours.
Selected themes in the history of South Africa from the African Iron Age to the Apartheid regime; history of race relations in the 19th and 20th centuries and the rise of modern industrial state.
Prerequisite: Junior or senior classification or approval of instructor.

Cross Listing: HIST 346/AFST 346.

AFST 352/PHIL 352 Africana Philosophy
Credits 3. 3 Lecture Hours.
Presentation of the seminal ideas of several influential Africana thinkers; recovery of the neglected traditions in which these thinkers locate themselves.
Prerequisite: Junior or senior classification or approval of instructor.

Cross Listing: PHIL 352/AFST 352.

AFST 353/PHIL 353 Radical Black Philosophies of Race and Racism
Credits 3. 3 Lecture Hours.
Critical evaluation of white supremacy, colonialism and the modern construction of race; examination of the historical background for contemporary theories of race.
Prerequisite: Junior or senior classification or approval of instructor.

Cross Listing: PHIL 353/AFST 353.

AFST 357/HIST 357 Out of Africa: The Black Diaspora and the Modern World
Credits 3. 3 Lecture Hours.
History and cultures of the peoples of the African Diaspora from the fourteenth through the nineteenth centuries; social, political, and economic impact on Africa, the Americas, Europe, and the Arab World; emphasis on race, gender, identity, and migration.
Prerequisite: Junior or senior classification or approval of instructor.

Cross Listing: HIST 357/AFST 357.

AFST 362/HIST 302 Women and War in the African Diaspora
Credits 3. 3 Lecture Hours.
Case studies of women and war in the African diaspora in a wide historical and comparative context; social, economic, and cultural influence of war on women’s lives; women as victims, combatants, and refugees; historical construction of race, ethnic and gender identity during times of conflict.
Prerequisite: Junior or senior classification.

Cross Listing: HIST 302.

AFST 379/ENGL 379 Postcolonial Literatures
Credits 3. 3 Lecture Hours.
Exploration of key terms, themes and debates within global literature written by colonized, occupied and diasporic peoples.
Prerequisites: 3 credits of literature at the 200-level or above.

Cross Listing: ENGL 379/AFST 379.

AFST 391 Africana Feminisms
Credits 3. 3 Lecture Hours.
Exploration of a significant topic in feminist theory by and about women from Africa and/or its Diaspora, from various disciplinary perspectives and historical periods, and with application to societal debates and controversies.
Prerequisite: Junior or senior classification.

AFST 393/ENGL 393 Studies in Africana Literature and Culture
Credits 3. 3 Lecture Hours.
Literary movements, genres, groups of authors, topics or issues in the literature and culture of people in African descent.
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification or approval of instructor.

Cross Listing: ENGL 393/AFST 393.
AFST 398/FILM 398 Africana Cinema  
Credits 3. 3 Lecture Hours.
Overview of African cinema; historical survey of cinema from Africa and the African Diaspora; introducing films produced in several geographical regions and reflecting different filmmaking traditions. May be taken two times for credit.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: FILM 398/AFST 398.

AFST 401 Slavery in World History  
Credits 3. 3 Lecture Hours.
Comparative history of human slavery; slavery in the Ancient World, Asia, Africa; varieties of modern slavery in the New World since 1500; abolition of slavery and continuing forms of human bondage in the contemporary world.
Prerequisite: Junior or senior classification.
Cross Listing: ASIA 401 and HIST 401.

AFST 425/COMM 425 Rhetoric of the Civil Rights Movement  
Credits 3. 3 Lecture Hours.
Rhetorical evaluation of theoretical literature and pragmatic episodes that shaped the U.S. Civil Rights Movement; examination of significant speeches, documents, and protest activities in their historical, political, and social contexts.
Prerequisite: Junior or senior classification.
Cross Listing: COMM 425/AFST 425.

AFST 481 Seminar  
Credits 3. 3 Lecture Hours.
Comparative studies of slave societies in the modern world; history and analysis of African American feminism; comparative analyses of the social, political, and economic condition of African Americans and other African peoples of the diaspora.
Prerequisite: AFST 302; junior or senior classification.

AFST 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.
Selected fields of Africana Studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit.
Prerequisite: Approval of director of Africana Studies.

AFST 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in Africana Studies. May be repeated for credit.

AFST 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in Africana Studies. May be taken for a maximum of 18 hours credit.
Prerequisites: 6 credits of AFST; junior or senior classification and approval of instructor.

AGCJ - Ag Comm & Journalism (AGCJ)

AGCJ 105 Introduction to Agricultural Communications  
Credits 3. 3 Lecture Hours.
Introduction to mass communication, its history, role in society, and especially its unique role in agriculture; importance of mass communication and the communication methods used in modern society; foundation for an understanding of agricultural news and information; credit cannot be given for both AGCJ 105 and JOUR 102.

AGCJ 281 Journalism Concepts for Agriculture  
Credits 3. 3 Lecture Hours.
The role of the news media in covering government, the court systems, corporations, taxation, and insurance; a practical perspective on how journalists interact with public and private institutions from a legal, ethical and social standpoint.
Prerequisite: AGCJ 105 or co-enrollment in AGCJ 105.

AGCJ 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.
Directed study of selected issue in field of agricultural communications with emphasis on collection, synthesis and interpretation of information.
Prerequisite: Approval of department advisor.

AGCJ 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.
Special topics in an identified area of agricultural development. May be repeated for credit.
Prerequisite: Approval of department advisor.

AGCJ 291 Research  
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member in agricultural communications and journalism. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of department advisor.

AGCJ 305 Theory and Practice of Agricultural Publishing  
Credits 3. 3 Lecture Hours.
Audience identification, publication content, management and design; analyze existing agricultural publications, identify audiences, advertising base and content; credit cannot be given for both AGCJ 305 and JOUR 321.
Prerequisites: AGCJ 105; junior or senior classification.

AGCJ 306 Theory and Practice of Agricultural Public Relations  
Credits 3. 3 Lecture Hours.
Public relations between agricultural producers and their suppliers as a critical part of agricultural communication; public relations objectives, strategies, tactics, evaluation and execution theory and practice examined; credit cannot be given for both AGCJ 306 and JOUR 324.
Prerequisites: AGCJ 105; junior or senior classification.

AGCJ 307 Design for Agricultural Media  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Principles and practices of agricultural media design, including design and production of printed publications and graphics; computer assisted design and production of media pieces. Required for AGCJ majors and minors.
Prerequisite: Junior or senior classification.

AGCJ 308 Agricultural Photography  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Develop knowledge of photography, editing software, and composition techniques used in the agricultural communications field; develop photography and photo editing skills to a satisfactory level as demonstrated by performance on assignments and exams.
Prerequisite: Junior or senior classification.
AGCJ 312 Editing for Agricultural Audiences
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Practices and principles of editing for agricultural and technical audiences including improving and tightening copy; writing headlines, titles, and subheads; photo editing and captions, graphics and layout; print, broadcast, interactive and other media; credit cannot be given for both AGCJ 304 and JOUR 304.
Prerequisites: AGCJ 105; junior or senior classification.

AGCJ 313 Agricultural Media Writing I
Credits 3. 2 Lecture Hours. 2 Lab Hours.
News gathering, writing, editing and ethics for current and emerging mediums used in agricultural communication; includes news identification, basic news writing methods, introduction to public relations, broadcast and Internet writing, interviewing skills, proper use of direct quotes and other news style; credit cannot be given for both AGCJ 312 and JOUR 203.
Prerequisite: Grade of C or better in AGCJ 105 and AGCJ 313.

AGCJ 314 Agricultural Media Writing II
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Interpretative agricultural news gathering and writing for all media types; basic media law and ethics, interviewing skills with assigned practice writing about agriculture, and science and technology, including meeting and event coverage both on and off campus; print, broadcast, interactive and other media; credit cannot be given for both AGCJ 312 and JOUR 203. Grade of C or better in AGCJ 312; junior or senior classification.

AGCJ 366 Radio Broadcasting
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Survey of American broadcasting, development, and impact; influence on society, basic principles, mass communication theory, station operating programming, advertising, rating services, regulation, and censorship; in-depth analysis of current issues and developments.
Prerequisite: Junior or senior classification.

AGCJ 380 Workshop in Agricultural Communications and Journalism
Credits 1 to 4. 1 to 4 Lecture Hours.
The study, understanding and solution of human-agricultural problems based on theories learned in the classroom, library, laboratory and fieldwork completed by individuals and teams.
Prerequisite: Junior or senior classification.

AGCJ 404 Communicating Agricultural Information to the Public
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Use of agricultural journalism principles and techniques to communicate scientific information related to agriculture, agribusiness, natural resources and life sciences to the general public; communication processes include audience identification, writing, editing and production of agricultural science-based manuscripts for popular and refereed publications.
Prerequisite: Junior or senior classification.

AGCJ 405 Agricultural Publications Production
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Study and practice of the principles and concepts of designing, writing, editing, producing and distributing the AgriLeader magazine and Web site; includes practical applications of writing feature articles, magazine and Web site design, advertising sales, layout and graphics. May be repeated once for credit.
Prerequisites: AGCJ 312, AGCJ 305; approval of instructor; junior or senior classification.

AGCJ 406 Agricultural Public Relations Methods
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Agricultural public relations campaign analysis; public relations case studies and methods including writing public relations plans for agricultural entities, producing public relations components and evaluating public relations objectives, strategies and tactics.
Prerequisites: AGCJ 306; junior or senior classification.

AGCJ 407 Web Authoring in Agricultural Communication
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Study and practice of basic website design theories, principles and writing for the web; use of web authoring software (not a programming class) to create online publications tailored for agricultural audiences; emphasizes informative content and functional design.
Prerequisites: AGCJ 307; junior or senior classification.

AGCJ 409 Television Production for Agricultural Journalists
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamental concepts required to develop a broadcast quality video production; uses the high definition facilities of KAMU-TV and TTVN; hands-on experience in video production including producing, shooting and hosting a professional program series broadcast on KAMU-TV.
Prerequisite: Junior or senior classification.

AGCJ 413 Emerging Media in Agriculture
Credits 3. 3 Lecture Hours.
Popular emerging media in agriculture to communicate, build and market a brand online; understanding the strategy behind the posts and other communications; create emerging media communications strategies for academic or business entities that may be implemented upon completion of course.
Prerequisite: AGCJ 313.

AGCJ 414 Audience and Communications Research Methods
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Evaluation and implementation of research designs and methods used in audience and communications research; data collection methods and strategies, including interviews, observations, focus groups, surveys and content analysis, use of descriptive and comparative analyses to develop data-driven personas and recommendations for engaging target audiences.
Prerequisite: Junior or senior classification.

AGCJ 416 Advanced Radio Broadcasting
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Project-based instruction; a practical guide to producing, presenting, programming and managing a radio station. May be taken four times for credit.
Prerequisites: AGCJ 366; junior or senior classification or approval of instructor.

AGCJ 481 Senior Seminar
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Identification of communication-related issues; strategic planning to meet goals; measurable communication outcomes; writing, designing, creating and distributing communications products to clients; measuring effectiveness; working in teams.
Prerequisites: Grade of C or better in AGCJ 313; senior classification.
AGCJ 485 Directed Studies
Credits 1 to 4. 1 to 4 Lecture Hours.
Directed individual study of selected problems in agricultural communications, communication methods and the communication profession with emphasis on collection, analysis and presentation of information.
Prerequisites: Junior or senior classification; approval of department advisor.

AGCJ 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Special topics in an identified area of agricultural communications and journalism. May be repeated for credit.
Prerequisite: Junior or senior classification.

AGCJ 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in agricultural communications and journalism. May be repeated 3 times for credit.
Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of department advisor.

AGCJ 494 Internship
Credits 1 to 6. 1 to 6 Other Hours.
Supervised internship and independent study related to the student’s professional interest.
Prerequisites: Junior or senior classification and approval of department advisor.

AGCJ 495 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study of selected problems in agricultural communications and journalism. May be repeated for credit.
Prerequisite: Open to all majors.

AGEC - Agricultural Economics (AGEC)

AGEC 105 Introduction to Agricultural Economics
Credits 3. 3 Lecture Hours.
(AGRI 2317) Introduction to Agricultural Economics. Characteristics of our economic system and basic economic concepts; survey of the farm and ranch firm and its organization and management; structure and operation of the marketing system; functional and institutional aspects of agricultural finance; government farm programs.

AGEC 216 Fundamentals of the AgriFood Sales Industry
Credit 1. 1 Lecture Hour.
Fundamentals of professional business to business sales in AgriFood firms; opportunities to interact with successful salespeople in AgriFood firms; focus on career development, exploration of undergraduate internships in professional sales and identification of basic sales theories currently in use in AgriFood firms; learning to network extensively with AgriFood industry professionals and developing a mentor relationship.

AGEC 217 Fundamentals of Agricultural Economics Analysis
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Relates contemporary agribusiness issues to economic and financial management, illustrating their integration toward pragmatic applications in the agricultural industry; lab focuses on the integration of mathematics and economics with computer skills directed toward spreadsheets, databases, web pages, and communications software; emphasis is on writing as a critical communication skill.
Prerequisites: AGEC 105; ENGL 103 or 104; MATH 141; MATH 142; and sophomore or junior agricultural economics or agribusiness majors; or approval of department head.

AGEC 223 Establishing Agribusiness Entrepreneurship Networks I
Credit 1. 1 Lecture Hour.
Introduction to successful entrepreneurs and other professionals, identifying suggested strategies and tactics in starting and sustaining viable rural and metropolitan business ventures; emphasis on importance of and how to develop relationships with a broad spectrum of mentors.
Prerequisite: Open to all majors.

AGEC 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study of selected problems in agricultural economics.
Prerequisites: AGEC 105; freshman or sophomore classification in agricultural economics, agribusiness, or approval of instructor and department head; 2.5 GPR in major, overall, and CBK courses, if applicable; see an academic advisor in Room 214 AGLS.

AGEC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of agricultural economics. May be repeated for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

AGEC 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in agricultural economics. May be repeated 3 times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

AGEC 314 Marketing Agricultural and Food Products
Credits 3. 3 Lecture Hours.
Operations involved in movement of agricultural commodities from farmer to consumer via several intermediaries; functions involve buying, selling, transportation, storage, financing, grading, pricing and risk bearing; agricultural supply chain or value chain is studied in detail; marketing aspects of commodities and differentiated goods.
Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.

AGEC 315 Food and Agricultural Sales
Credits 3. 3 Lecture Hours.
Principles of professional sales techniques used in food and agricultural firms; develop a professional sales presentation; study current agribusiness industry professional salespersons.
Prerequisite: Junior or senior classification.

AGEC 316 Building Customer Relationships in AgriFood Selling
Credits 3. 3 Lecture Hours.
Use of emotional intelligence factors in developing business-to-business customer relationships for AgriFood, real estate, finance and other industrial products and services; developing customer relationships with regard to the unique aspects of technical products and services in these industries.
Prerequisite: AGEC 315.

AGEC 317 Economic Analysis for Agribusiness Management
Credits 3. 3 Lecture Hours.
Quantitative methods used to address managerial problems, specifically calculus-based optimization, marginal analysis, elasticities, statistical and forecasting techniques, linear programming, and risk analysis; emphasis on theoretical aspects and applied analysis of managerial problems faced by agricultural firms.
Prerequisites: AGEC 217; ECON 322 or ECON 323; SCMT 303 or STAT 301 or STAT 302 or STAT 303; and junior or senior classification; agricultural economics, agribusiness majors only; or approval of department head.
AGEC 324 Agribusiness Entrepreneurship – Budgeting
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Case study approach to demonstrate a process for evaluating the economic feasibility of a single-enterprise rural or metropolitan business venture; relevant production, marketing and financing costs, in combination with capital ownership and overhead costs; computer spreadsheets including attention to deterministic sensitivity analyses; computer capabilities are essential.
Prerequisites: AGEC 105 or ECON 202; ACCT 209 or ACCT 210 or ACCT 229 or ACCT 230 or AGEC 330 or FINC 341 or FINC 409; junior or senior classification or approval of instructor.

AGEC 325 Principles of Farm and Ranch Management
Credits 3. 2 Lecture Hours.
Agribusiness managerial decision making and analysis in different market environments; emphasis is on profit maximization; lab focuses on using computerized methods for evaluating management alternatives for farming and ranching problem situations.
Prerequisites: AGEC 105 or ECON 202; junior or senior non-agricultural economics, nonagribusiness majors only; and knowledge of Excel.

AGEC 330 Financial Management in Agriculture
Credits 3. 3 Lecture Hours.
Principles of financial management of farms, ranches, and other agribusiness firms; financial statements, financial statement analysis, time value of money, investment analysis, firm growth, risk management, credit analysis and best business management practices.
Prerequisites: AGEC 105 or 3 hours of economics; ACCT 209 or ACCT 229; and junior or senior classification.

AGEC 340 Agribusiness Management
Credits 3. 3 Lecture Hours.
Survey of management practices throughout the food marketing chain; focuses on farm and ranch suppliers, farmers and ranchers, first handlers, food processors, food distributors, and restaurants, food retailers and institutions; use of case studies and models for the purpose of evaluating firm management success.
Prerequisites: AGEC 105 or 3 hours of economics; and junior or senior classification.

AGEC 344 Food and Agricultural Law
Credits 3. 3 Lecture Hours.
Legal principles relevant to the farm family and business; characteristics of legal decisions and rules on property rights, and fencing laws; analysis of global, national, state, and local legal issues in contracts, torts, water, pollution, and natural resources.
Prerequisite: Junior or senior classification.

AGEC 350 Environmental and Natural Resource Economics
Credits 3. 3 Lecture Hours.
Inspection of issues such as environmental degradation, population growth, recycling, water use and depletion, natural habitat protection, water and air pollution, acid deposition, fishery management, and global warming using economically derived principles and tools.
Prerequisite: Junior or senior classification.

AGEC 401 Global Agri-Industries and Markets: Study Abroad
Credits 3. 3 Lecture Hours.
Understanding agriindustries and markets; analysis of production; importing; exporting; provides classroom experience with an exposure to a variety of global cultures in an international setting. Course may be repeated 3 times for credit.
Prerequisites: AGEC 105 or 3 hours of economics; junior or senior classification or approval of department head.

AGEC 402 Survey of International Agricultural Economics: Study Abroad
Credits 3. 3 Lecture Hours.
Examine, from an international setting, the shape of international agriculture; how culture, history, politics and geography in foreign countries affect the production and management of agricultural products; agricultural policy formation; countries' natural resources and competitive strategies; may be taken 3 times for credit.
Prerequisites: AGEC 105 or 3 hours of economics; junior or senior classification or approval of department head.

AGEC 408 Economics of Foreign Intervention, Conflict and Development
Credits 3. 3 Lecture Hours.
Economic models of conflict and development; dynamic socio-political models of conflict; conflict and vulnerable groups; quantitative techniques and methods in conflict and development research; interaction between poverty, natural resources and conflict in developing countries; role of multilateral, bilateral, and strategic stakeholders in conflict resolution and promotion of economic development.
Prerequisites: AGEC 105 or ECON 202 or equivalent, ENGL 104; or approval of instructor.

AGEC 413 Agricultural Cooperatives
Credits 3. 3 Lecture Hours.
Historical development and principles of cooperative associations in our economic system; organizational and operational aspects of cooperatives; legal considerations, financing, management, and member relations; and future role of cooperatives.
Prerequisites: AGEC 105; AGEC 314; and junior or senior classification.

AGEC 414 Agribusiness and Food Market Analysis
Credits 3. 3 Lecture Hours.
Application of economic and marketing principles to contemporary food and agribusiness marketing; practical marketing management for agribusiness firms; market analysis; and marketing strategy and planning as related to the emerging trends in the global food and agribusiness sector of the economy.
Prerequisites: AGEC 317; FINC 341; MKTG 321; and junior or senior agribusiness majors only.

AGEC 415 Food and Agribusiness Strategic Market Planning
Credits 3. 3 Lecture Hours.
Development of a market plan targeting the food and agribusiness market sector; market analysis; business propositions; action plans for executing the 4 P's (Product, Price, Place, Promotion); monitoring and measurement.
Prerequisites: AGEC 314 or MKTG 321 or MKTG 409; AGEC 315; junior or senior classification or approval of instructor.

AGEC 416 Sales Management and Advanced Techniques in Professional Technical Selling for AgriFood Firms
Credits 3. 3 Lecture Hours.
Principles and practices of sales management in food and agricultural firms; focus on business-to-business selling situations, theoretical and practical information about sales management for AgriFood firms; application of principles.
Prerequisite: AGEC 315.
AGEC 420 Food Security, Climate and Conflict
Credits 3. 3 Lecture Hours.
Economic models of food production and consumption in conflict regimes; the micro-economics of violence; the dynamic relationships of climate and agricultural production; potential impacts of climate change on food and socio-political security; food security among insurgent groups; conflict resistant food systems; and the shifting relationships between poor and rich nations in relationship to climate, food and conflict.
Prerequisites: AGEC 105 or ECON 202, junior or senior classification, or approval of instructor.

AGEC 422 Land Economics
Credits 3. 3 Lecture Hours.
Economic, institutional, and physical factors involved in the use and control of natural resources; includes elements of introductory land economics as a discipline, economic foundations of land economics, institutional influences on land use, and the effects of public policy on land use.
Prerequisites: AGEC 105 or 3 hours economics; and junior or senior classification.

AGEC 423 Establishing Agribusiness Entrepreneurship Networks II
Credit 1. 1 Lecture Hour.
Engagement opportunities with successful agri/metropolitan entrepreneurs and other professionals, focusing on strategies and tactics for starting and sustaining viable rural and metropolitan business ventures; emphasis on importance of, and how to, develop relationships with a broad spectrum of mentors.
Prerequisites: Concurrent enrollment in AGEC 424; junior or senior classification or approval of instructor. May not enroll in AGEC 223 and AGEC 423 during the same semester.

AGEC 424 Agribusiness Entrepreneurship – Economic Analysis
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Strategic planning regarding economic feasibility of a single-enterprise rural or metropolitan business venture; emphasis on processes for developing a comprehensive enterprise budget and construction and evaluation of risk management alternatives; exchanges with “real-world” entrepreneurs, financial experts and other management personnel; computer capabilities essential.
Prerequisites: AGEC 105 or ECON 202; ACCT 209 or ACCT 229 or ACCT 210 or ACCT 229 or ACCT 230 or AGEC 324 or AGEC 330 or FINC 341 or FINC 409; junior or senior classification or approval of instructor.

AGEC 425 Agribusiness Entrepreneurship – Financial Analysis
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Strategic planning regarding rural and metropolitan business ventures; emphasis on processes for developing comprehensive economics and financial prospectuses, including enterprise budgets, risk management planning, cash flow budgeting, net worth statements, income budgets, reconciliation statements and shock analysis; mentoring exchanges with “real-world entrepreneurs, financial experts and other management personnel.
Prerequisites: AGEC 424; and junior or senior classification.

AGEC 429 Agricultural Policy
Credits 3. 3 Lecture Hours.
Analysis of the causes, nature, and effects of government participation in agriculture; and interrelationship of the American agriculture and agribusiness sector with the political and economic system, public administration, and interest group representation.
Prerequisites: AGEC 105, ECON 202 or ECON 203; ENGL 103 or ENGL 104; and junior or senior classification.

AGEC 430 Macroeconomics of Agriculture
Credits 3. 3 Lecture Hours.
Basic functioning of U.S. economy and relationship to agriculture; the differential effects of macroeconomic policy on disposable income, interest rates, unemployment, inflation and exchange rates; impact on agricultural commodity prices, farm input costs, net farm income, farmland values and key financial indicators.
Prerequisites: AGEC 105 or 3 hours of economics; AGEC 317 or concurrent enrollment; AGEC 429; AGEC 330 or FINC 341 or FINC 409; and junior or senior classification.

AGEC 431 Cases in Agribusiness Finance
Credits 3. 3 Lecture Hours.
Financial management of agribusiness firms; advanced topics in financial statement analysis, liquidity management, investment analysis, and capital structure illustrated through examination of agribusiness cases.
Prerequisites: AGEC 317; AGEC 340; FINC 341; and junior or senior agribusiness majors only.

AGEC 432 Rural Real Estate and Financial Analysis
Credits 3. 3 Lecture Hours.
Advanced topics in investment analysis; financial intermediation in agriculture; real estate markets and market analysis; and appraisal valuation.
Prerequisites: AGEC 317 (waived for nonmajors); AGEC 330 or FINC 341 or FINC 409; AGEC 422; ACCT 210 or ACCT 230; and junior or senior classification.

AGEC 434 Rural Financial Markets and Financial Planning
Credits 3. 3 Lecture Hours.
Organization, structure, conduct and regulation of lending institutions serving commercial agriculture and rural borrowers; borrower financial statement analysis, business forecasting, investment analysis and loan application process; lender credit application underwriting standards, credit scoring and loan decision making process; agricultural loan portfolio analysis.
Prerequisites: ACCT 209 or ACCT 229; ACCT 210 or ACCT 230; AGEC 330 or FINC 341 or FINC 409; junior or senior classification.

AGEC 435 Financial Planning for Professionals
Credits 3. 3 Lecture Hours.
Financial planning from a professional perspective; applying basic financial, economic and institutional concepts to advise individuals, families and small businesses in achieving their financial goals; tools and topics include financial analysis, budgeting, credit management, time value of money, investment strategies, income taxes, risk management, and retirement and estate planning.
Prerequisites: AGEC 330, FINC 409 or FINC 341; junior or senior classification.

AGEC 436 Insurance and Estate Planning
Credits 3. 3 Lecture Hours.
Insurance and estate planning for individuals, families and small businesses; applies risk management principles to evaluate various insurance products, including life, disability, long-term care, health, homeowners, auto and liability; estate planning process, tools and considerations.
Prerequisites: AGEC 330, AGEC 435, FINC 409 or FINC 341; junior or senior classification.
**AGEC 437 Tax Planning**  
*Credits 3. 3 Lecture Hours.*  
Applies the principles of income, gift and estate tax planning to enhance household income after taxes; understanding tax laws, reporting requirements and opportunities for planning; identify and implement useful tax planning strategies; focus on practical application for financial planning.  
**Prerequisites:** AGEC 330, AGEC 435, FINC 409 or FINC 341; junior or senior classification.

**AGEC 438 Investment Planning**  
*Credits 3. 3 Lecture Hours.*  
Applying investment principles considering families’ goals, time horizons, risk tolerance and tax implications to build investment portfolios; attributes of various asset classes; asset allocation, selecting securities and portfolio management; developing successful investment programs for personal investors and financial planners.  
**Prerequisites:** AGEC 435 and junior or senior classification.

**AGEC 439 Retirement Planning**  
*Credits 3. 3 Lecture Hours.*  
Retirement planning basics, qualified and nonqualified retirement plans, Social Security provisions and government healthcare plans along with the basics of employee benefits; focus on both quantitative (i.e., calculating retirement needs and plan limits) and qualitative (i.e., retirement age decisions, retirement income management) aspects of retirement.  
**Prerequisite:** AGEC 435 and junior or senior classification.

**AGEC 440 Agribusiness Strategic Analysis**  
*Credits 3. 3 Lecture Hours.*  
Strategic management and economic principles for the agribusiness system; problem recognition and applied managerial/economic decision making with related considerations in marketing, production, or finance for agribusiness firms.  
**Prerequisites:** AGEC 317; AGEC 340; FINC 341; MGMT 363; MKTG 321; and junior or senior agribusiness majors only.

**AGEC 441 Financial Planning Capstone**  
*Credits 3. 3 Lecture Hours.*  
Financial planning process, data gathering, approaches to financial planning, analysis of financial statements and client presentation; case analysis, ethics and professional conduct, use of financial planning software, advanced financial calculator usage, and Microsoft Excel applications.  
**Prerequisites:** AGEC 435, AGEC 436, AGEC 437, AGEC 438 and AGEC 439; junior or senior classification.

**AGEC 444 Food and Agricultural Price Analysis**  
*Credits 3. 3 Lecture Hours.*  
Factors influencing the level of food and agricultural prices; price trends and seasonal variation; methods of forecasting demands and prices; and futures trading.  
**Prerequisites:** AGEC 314; AGEC 317; and junior or senior classification.

**AGEC 445 Agricultural Commodity Futures**  
*Credits 3. 3 Lecture Hours.*  
Activities of commodity futures exchanges; the mechanics of trading futures contracts; the use of futures trading for hedging and forward pricing; and options, basis behavior, and hedging strategies for selected commodities.  
**Prerequisites:** AGEC 105 or 3 hours of economics; AGEC 314; AGEC 317 or concurrent enrollment; and junior or senior classification; or approval of department head.

**AGEC 452 International Trade and Agriculture**  
*Credits 3. 3 Lecture Hours.*  
Changing role of U.S. agriculture in a dynamic world economy; national and international policies and institutions affecting agriculture; and exchange rates, tariffs, and non-tariff barriers.  
**Prerequisites:** AGEC 105 or 3 hours of economics; and junior or senior classification.

**AGEC 453 International Agribusiness Marketing**  
*Credits 3. 3 Lecture Hours.*  
Basic competencies in international marketing of agri-foods; and market entry, pricing, payment, finance, and promotion.  
**Prerequisites:** AGEC 105 or 3 hours of economics; and junior or senior classification.

**AGEC 460 Cross-Cutting Issues in Agricultural Economics**  
*Credits 3. 3 Lecture Hours.*  
Examination of economic theory and its history; emphasis on the areas of agricultural business, finance, macroeconomics, management, marketing, microeconomics, quantitative analysis, resources, and economics policy; emphasis on the ability to properly analyze economic problems.  
**Prerequisites:** AGEC 317; AGEC 341 or MKTG 321 or MKTG 409; AGEC 330 or FINC 341 or FINC 409; AGEC 429; agricultural economics and agribusiness majors only; junior or senior classification or approval of instructor.

**AGEC 481 Ethics in Agribusiness and Agricultural Economics**  
*Credit 1. 1 Lecture Hour.*  
Examination of the principals of ethical business behavior; context created through assigned readings, guest speakers from various law enforcement branches and private industry; student written reports about their own experiences relative to this context; attention given to establishing personal principles for an ethical business career.  
**Prerequisites:** AGEC 217; junior or senior classification; and agricultural economics or agribusiness majors only.

**AGEC 484 Internship**  
*Credits 0 to 6. 0 to 6 Other Hours.*  
Supervised experience program conducted in the area of the student’s interest in agricultural economics and agribusiness. May be taken two times.  
**Prerequisite:** See an advisor in Room 214 AGLS Building.

**AGEC 485 Directed Studies**  
*Credits 0 to 6. 0 to 6 Other Hours.*  
Special problems not covered by other courses. Content will depend upon problem studied.  
**Prerequisite:** See an advisor in Room 214 AGLS Building.

**AGEC 489 Special Topics in...**  
*Credits 1 to 4. 1 to 4 Lecture Hours.*  
Selected topics in an identified area of agricultural economics. May be repeated for credit.  
**Prerequisite:** Junior or senior classification.

**AGEC 491 Research**  
*Credits 0 to 6. 0 to 6 Other Hours.*  
Research conducted under the direction of faculty member in agricultural economics. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.  
**Prerequisites:** Junior or senior classification and approval of department head; see an advisor in Room 214 AGLS Building.
AGLS - Ag & Life Sciences (AGLS)

AGLS 101 Modern Agricultural Systems and Renewable Natural Resources
Credit 1. 1 Lecture Hour.
(AGRI 1131, 1231) Modern Agricultural Systems and Renewable Natural Resources. An introduction to modern agriculture and the natural, human and scientific resources upon which it depends. Freshman or sophomore classification.

AGLS 105 Research in Agriculture and Life Sciences
Credit 1. 1 Lecture Hour.
An introduction to the research process as applied to agriculture, renewable natural resources and biological sciences.
Prerequisite: Freshman classification, major in College of Agriculture and Life Sciences and approval of instructor.

AGLS 125 Life Sciences Learning Community I
Credit 1. 1 Lecture Hour.
Development of personal and professional competencies in the life sciences: learning styles, leadership skills, appreciation for the arts; ethics in science, problem solving skills, experimental design, data gathering and interpretation, introduction to life sciences literature, critical analysis skills, and the connectivity between life science disciplines. May be taken two times for credit.
Prerequisites: Freshman classification and approval of instructor.

AGLS 225 Life Sciences Learning Community II
Credit 1. 1 Lecture Hour.
Continuation of the development of personal and professional competencies in the life sciences: ethics in science, problem solving skills, experimental design, data gathering and interpretation, examination of life sciences literature, critical analysis skills, and the connectivity between life science disciplines. May be taken two times for credit.
Prerequisites: Freshman classification and approval of instructor.

AGLS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of agricultural and life science. May be repeated for credit.
Prerequisite: Freshman or sophomore.

AGLS 292 Cooperative Education in Agriculture
Credits 2. 4 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study; supervision of the student by the cooperating employer and the instructor; a technical report, approved by the instructor, on a related subject area required.
Prerequisite: AGLS 292.

AGLS 301 College of Agriculture and Life Sciences Study Abroad
Credits 1 to 18. 1 to 18 Other Hours.
For students in approved programs abroad. May be repeated for credit.
Prerequisites: Admission to approved program and approval of academic dean.

AGLS 392 Cooperative Education in Agriculture
Credits 2. 40 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student by the cooperating employer and the instructor; a technical report, approved by the instructor, on a related subject area required.
Prerequisite: AGLS 292.

AGLS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of agricultural and life sciences.

AGLS 492 Cooperative Education in Agriculture
Credits 2. 40 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study; supervision of the student by the cooperating employer and the instructor; a technical report, approved by the instructor, on a related subject area required.
Prerequisite: AGLS 392.

AGRO - Agronomy (AGRO)

AGSC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Special topics in an identified area of agricultural science. May be repeated for credit.
Prerequisite: Approval of department head.

AGSC 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in agricultural science. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

AGSC 301 Introduction to Agricultural Science Teaching
Credits 3. 3 Lecture Hours.
Introduction to agricultural science teaching at the secondary level; an overview of preparing teachers for a changing world including knowledge of learners, subject matter and teaching within the context of agricultural science.
Prerequisite: Junior or senior classification.

AGSC 305 Management of Supervised Agricultural Experiences
Credits 3. 3 Lecture Hours.
Overview of supervised agricultural experiences (SAEs) and content that can be used in the secondary agricultural science program; engagement in SAE programs; management practices for SAE projects including record keeping and student reports.
Prerequisite: Junior or senior classification.

AGSC 373 Managing Safety in the Agricultural Science Program
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Safety principles and procedures, methods of teaching and motivating students in agricultural mechanics; design for those preparing to teach agricultural science in Texas public schools.
Prerequisite: Junior or senior classification.

AGSC 380 Workshop in Agricultural Science
Credits 1 to 4. 1 to 4 Lecture Hours.
The study, understanding and solution of human-agricultural problems based on theory learned in the classroom, library, laboratory and fieldwork completed by individuals and teams.
Prerequisite: Junior or senior classification.
AGSC 383 Teaching Agricultural Mechanics  
Credits 3. 2 Lecture Hours.  3 Lab Hours.  
Methods of teaching and motivating students in agricultural mechanics; designed for students preparing to teach agricultural science in Texas public schools.  
**Prerequisites:** AGSC 301 and AGSC 373.

AGSC 384 Clinical Professional Experience in AGSC  
Credits 3. 2 Lecture Hours.  3 Lab Hours.  
Clinical field experience for students preparing to teach agricultural science in public schools of Texas; through first-hand observation, students will study learning theories, individual differences, teaching methods, classroom management, curriculum, school climate and culture, and teacher roles and responsibilities.  
**Prerequisite:** AGSC 301.

AGSC 402 Designing Instruction for Secondary Agricultural Science Programs  
Credits 3. 2 Lecture Hours.  3 Lab Hours.  
Theory and practice in designing instruction for secondary agricultural science programs including effective planning and delivery methods; designed for students preparing to teach agricultural science in Texas public schools.  
**Prerequisites:** AGSC 384; concurrent enrollment in AGSC 405.

AGSC 405 Facilitating Complete Secondary Agricultural Science Programs  
Credits 3. 2 Lecture Hours.  3 Lab Hours.  
Theory and practice in facilitating secondary agricultural science programs: includes classroom instruction, supervised experience, and youth leadership development; designed for students preparing to teach agricultural science in Texas public schools.  
**Prerequisites:** AGSC 384; concurrent enrollment in AGSC 402.

AGSC 425 Learner Centered Instruction in Agricultural Science  
Credits 3. 3 Lecture Hours.  
Preparing curriculum materials for secondary agricultural science and adult education programs.  
**Prerequisites:** Grade of C or better in AGSC 402 and AGSC 405.

AGSC 436 Professional Teaching Internship in AGSC  
Credits 6. 2 Lecture Hours.  12 Lab Hours.  
Planning for and teaching secondary agricultural science in selected high schools in Texas; includes 12 weeks of professional teaching experience under the guidance of a university supervisor and a cooperating teacher in the school.  
**Prerequisites:** Grade of C or better in AGSC 402 and AGSC 405.

AGSC 481 Seminar  
Credit 1.  1 Lecture Hour.  
Review of current literature and research as related to program development in light of legislation and policies affecting education in agriculture.  
**Prerequisite:** Grade of C or better in AGSC 402 and AGSC 405.

AGSC 484 Field Experience  
Credits 1 to 6.  1 to 6 Other Hours.  
An on-the-job supervised experience program conducted in the area of the student’s specialization.  
**Prerequisites:** Grade of C or better in AGSC 402 and AGSC 405.

AGSC 485 Directed Studies  
Credits 1 to 4.  1 to 4 Lecture Hours.  
Directed individual study of selected problems in agricultural science with emphasis on collection, analysis and presentation of information. May be repeated for credit.  
**Prerequisite:** Junior or senior classification; approval of instructor.

AGSC 489 Special Topics in...  
Credits 1 to 4.  1 to 4 Lecture Hours.  0 to 4 Lab Hours.  
Special topics in an identified area of agricultural science. May be repeated for credit.  
**Prerequisite:** Approval of department head.

AGSC 491 Research  
Credits 1 to 4.  1 to 4 Other Hours.  
Research conducted under the direction of faculty member in agricultural science. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.  
**Prerequisites:** Junior or senior classification and approval of instructor.

AGSC 494 Internship  
Credits 1 to 6.  1 to 6 Other Hours.  
Supervised internship and independent study related to student’s professional interest.  
**Prerequisites:** AGSC 301; junior or senior classification; 2.0 GPR; approval of instructor.

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**AGSM - Agricultural Systems Mgmt (AGSM)**

AGSM 125 Introduction to Agricultural Systems Management  
Credit 1.  2 Lab Hours.  
Introduction to technical management of agricultural systems using management projects presented by agricultural managers from industry; problem definition, information search, idea generation and development of management solutions.  
**Prerequisite:** Freshman or sophomore classification or approval of instructor; majors only.

AGSM 201 Agricultural Energy and Power Systems  
Credits 3.  2 Lecture Hours.  2 Lab Hours.  
(AGRI 2301) Agricultural Energy and Power Systems. A study of the types of power and energy sources used in agricultural equipment and systems; management considerations for selecting, operating and maintaining internal combustion engines, electric equipment and motors, and renewables as power sources.

AGSM 284 Internship  
Credits 0.  0 Lecture Hours.  0 Lab Hours.  0 Other Hours.  
No Credit. Practical experience working in a professional agricultural systems management setting. May be taken three times.  
**Prerequisite:** Freshman or sophomore classification; approval of the instructor.

AGSM 285 Directed Studies  
Credits 0 to 4.  0 to 4 Other Hours.  
Selected problems in any phase of agricultural systems management; credit and specific content dependent upon background, interest, ability and needs of student enrolled; individual consultations and reports required.  
**Prerequisites:** Freshman or sophomore classification; approval of department head.
AGSM 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of agricultural systems management. May be repeated for credit.  
Prerequisite: Approval of instructor.

AGSM 291 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of faculty member in agricultural systems management.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

AGSM 301 Systems Analysis in Agriculture  
Credits 3. 3 Lecture Hours.  
Operations research and systems theory applied to management problems in food and agricultural industries; linear programming, queuing theory, simulation and critical path method; provides the knowledge and computer skills to better manage resources for the evolving agricultural industries.  
Prerequisites: MATH 141 and MATH 142 with a grade of C or better.

AGSM 310 Agricultural Machinery Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Selection of a matched complement of power units and machines for farming operations; consider constraints such as crops, season, weather, personnel and capital; apply systems techniques such as linear programming, optimization, queuing theory and inventory models; utilize available software programs and learn to develop electronic spreadsheets and other customized software.  
Prerequisites: AGSM 301; AGEC 330; or registration therein.

AGSM 315/FSTC 315 Food Process Engineering Technology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Elementary mechanics, physical and thermal properties of food and processing materials, heat transfer, mass and energy balances, psychrometrics (properties of air), insulation.  
Prerequisites: PHYS 201 or PHYS 218, or approval of instructor.  
Cross Listing: FSTC 315/AGSM 315.

AGSM 325 Agri-Industrial Applications of Electricity  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Elements of electric current generation and transmission, applications of electric heating, lighting and power, wiring, motors, energy rates, meter reading, safety rules and regulations.  
Prerequisite: Agricultural systems management majors only or approval of instructor.

AGSM 335 Water and Soil Management  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Elementary principles of surface and ground water supply, flood control, water distribution systems and irrigation systems; principles of drainage, soil conservation and erosion control; elementary surveying, chaining, leveling and mapping applied to agricultural and natural resource needs; illustrated by practical examples of terracing and farm pond design.  
Prerequisite: AGSM 301.

AGSM 337 Technology for Environmental and Natural Resource Engineering  
Credits 3. 3 Lecture Hours.  
For the nonengineering student in the environmental and management sciences; concentrates on the application of technology for solving local environmental problems while considering global issues; reduction of water, air and hazardous waste pollutants; legislative issues and modeling.  
Prerequisites: AGSM 301 and MATH 142.

AGSM 355 Energy and Conversion Systems  
Credits 3. 3 Lecture Hours.  
Basic physical conversion principles of energy use, including historical and future patterns; conservation measures, alternative energy sources, and the environment impact of U.S. and world energy use.  
Prerequisites: Junior or senior classification; non-majors only.

AGSM 360 Occupational Safety Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Safety considerations in the work environment, including safety mandates, safety mission, personal and business liability, fire, chemical, dust, machine noise, personal protective devices; design and implementation of safety programs.  
Prerequisite: Junior or senior classification.

AGSM 403 Processing and Storage of Agricultural Products  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Factors influencing the nature of biological materials and the preservation of quality throughout the harvesting, handling and processing system; a systems approach to cereal grains includes principles of drying, quality deterioration, storage, conveying and handling; processing of fiber crops.  
Prerequisites: AGSM 310 and AGSM 315/FSTC 315.

AGSM 417/FSTC 417 Food Process Engineering Technology II  
Credits 3. 3 Lecture Hours.  
Applications of basic engineering concepts to understand common unit operations in the food (and related) industry.  
Prerequisites: AGSM 315/FSTC 315 or FSTC 315/AGSM 315.  
Cross Listing: FSTC 417/AGSM 417.

AGSM 435 Irrigation Principles and Management  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Principles of irrigation and management for efficient use of water; soil-water-plant relationships; methods of application; power and labor requirements; automated systems and components.  
Prerequisites: AGSM 335, AGSM 301, MATH 141.

AGSM 439 Management of Agricultural Systems I  
Credits 3. 3 Lecture Hours.  
Application of agricultural systems management principles in solving realistic problems faced by agribusiness managers; project selection from problems posed by biological and agricultural industrial consultants; project feasibility study and outline; management and application philosophy; teamwork and communication, economics; product liability and reliability; standards and codes; goal setting and time management.  
Prerequisites: AGSM 301, AGSM 315/FSTC 315, AGSM 325, and AGSM 360; AGSM 335, AGSM 337 and AGSM 403 or registration therein; senior classification; must be taken prior to AGSM 440; AGSM majors only.

AGSM 440 Management of Agricultural Systems II  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Management of agricultural systems through team solution of management problems posed by agribusiness managers, farmers, extension specialists and other industry consultants; application of management principles to give students experience in solving realistic problems faced by agribusiness managers; critical evaluation of results by students, staff and consultants.  
Prerequisites: AGSM 439; should be taken last spring semester prior to graduation.
AGSM 461/SPSC 461 Geographic Information Systems for Resource Management  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**  
Geographic Information System (GIS) approach to the integration of spatial and attribute data to study the capture, analysis, manipulation and portrayal of natural resource data; examination of data types/formats; integration of GIS with remote sensing and Global Positioning System; lab use of GIS applications to conduct analyses of topics in natural resources.  
**Prerequisite:** Junior or senior classification or approval of instructor.  
**Cross Listing:** SPSC 461/AGSM 461.  

AGSM 470 Agricultural Electronics and Control  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**  
Technology of electronic systems in agricultural production and processing, sensors, actuators, and controllers, controller hardware and computer bases.  
**Prerequisite:** AGSM 325.  

AGSM 473 Project Management for Agricultural Systems Technology  
**Credits 3. 3 Lecture Hours.**  
Development of fundamental skill set in project management; basic knowledge of project management methods, tools and techniques; includes organization and life cycle, management processes, integration management, time management, cost management, quality management, communications management, risk management, procurement management, stakeholder management.  
**Prerequisites:** AGSM 301 and senior classification.  

AGSM 475 Applied Information Technologies for Agricultural Systems  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**  
Definition and documentation of the value of information in agriculturally-based technology companies; methods for mapping information flow within the company and across companies; articulation value of information within a value chain for a food product by simulation; and projects using project management software and web-based interactions.  
**Prerequisites:** ISTM 209 or equivalent; junior or senior classification.  

AGSM 481 Seminar  
**Credit 1. 1 Lecture Hour.**  
Professional development; ethics; career opportunities and topics of interest related to the practice of agricultural systems management.  
**Prerequisite:** Senior classification.  

AGSM 484 Internship  
**Credits 0 to 6. 0 to 6 Other Hours.**  
Practical experience working in a professional agricultural and/or food systems management setting. May be taken three times.  
**Prerequisites:** Junior or senior classification; approval of the instructor.  

AGSM 485 Directed Studies  
**Credits 0 to 4. 0 to 4 Other Hours.**  
Selected problems in any phase of agricultural systems management; credit and specific content depend on background and interest of student; individual consultations and reports required.  
**Prerequisites:** Junior classification; approval of department head; 2.0 GPR.  

AGSM 489 Special Topics in...  
**Credits 1 to 4. 1 to 4 Lecture Hours.**  
Special topics in an identified area of agricultural systems management. May be repeated for credit.  

AGSM 491 Research  
**Credits 0 to 3. 0 to 3 Lecture Hours.**  
Research conducted under the direction of faculty member in agricultural systems management. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.  
**Prerequisites:** Junior or senior classification and approval of instructor.

**ALEC - Ag Leadership, Education & Communication (ALEC)**

**ALEC 201 Foundations of Agricultural Leadership, Education and Communications**  
**Credits 2. 2 Lecture Hours.**  
Survey of historical perspectives and future career opportunities in the field of agricultural leadership, education and communications; addresses undergraduate degree planner and departmental high-impact learning experiences; explores field of study standards for communication and publication; investigates learning preferences and academic support systems.  
**Prerequisites:** Freshman or sophomore classification; AGCJ, AGSC, ALED or USAL-LED majors.  

**ALEC 285 Directed Studies**  
**Credits 1 to 4. 1 to 4 Other Hours.**  
Directed study of selected issue in field of agricultural leadership, education, and communications with emphasis on collection, synthesis and interpretation of information. May be taken four times for credit.  
**Prerequisite:** Approval of department advisor.  

**ALEC 289 Special Topics in...**  
**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.**  
Special topics in an identified area of agricultural development. May be repeated for credit.  
**Prerequisite:** Approval of department advisor.  

**ALEC 291 Research**  
**Credits 1 to 4. 1 to 4 Lecture Hours.**  
Research conducted under the direction of faculty member in agricultural communications and journalism. May be taken two times for credit.  
**Prerequisites:** Freshman or sophomore classification and approval of department advisor.  

**ALEC 350 Global Agricultural Issues**  
**Credits 3. 3 Lecture Hours.**  
Review of global agricultural issues (products, environment, people, and culture) affecting international agricultural development; concepts and principles underlying the processes of teaching, research, and service opportunities in international agricultural development and education situations.  
**Prerequisites:** Junior or senior classification or approval of instructor; GEOG 202.  

**ALEC 380 Workshop in Agricultural Leadership, Education, and Communications**  
**Credits 1 to 4. 1 to 4 Lecture Hours.**  
The study, understanding and solution of human-agricultural problems based on theory learned in the classroom, library, laboratory and fieldwork completed by individuals and teams. May be taken three times for credit.  
**Prerequisite:** Junior or senior classification.
ALEC 412 Technology-Enhanced Instructional Design Strategies for Agriculture
Credits 3. 3 Lecture Hours.
Techniques and applications of technology to enhance instruction of agricultural topics; instructional design principles, instructional strategies, technological tools; the design, development and delivery of technology-enhanced instruction for agriculture and the life sciences. Not intended for majors in education.
Prerequisite: Junior or senior classification.

ALEC 425 Principles of Program Evaluation
Credits 3. 3 Lecture Hours.
Evaluation principles applied to educational programs in agriculture and life science; basic understanding of skills in program evaluation processes, concepts, and theories; develop expertise needed to design and conduct evaluations of youth and adults in extension, community, and school-based programs.
Prerequisite: Junior or senior classification.

ALEC 450 Global Social Justice Issues in Agriculture
Credits 3. 3 Lecture Hours.
An in-depth evaluation of global social justice issues and leadership skills necessary to effectively solve and manage issues in agricultural development; topics include awareness, knowledge and understanding of teaching, research and service opportunities for those seeking careers in global social justice and agricultural leadership.
Prerequisite: Junior or senior classification.

ALEC 460 Applying International Development Theories in Agriculture
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Practical application of agricultural development theories (geographical, communal, societal, etc.) in real-world settings; high-impact learning, research skill development, international travel and participation in a service-learning project with an international non-governmental organization.
Prerequisites: Junior or senior classification or approval of instructor.

ALEC 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed individual study of selected problems in international agriculture leadership, education and communications. May be taken four times for credit.
Prerequisites: Junior or senior classification; approval of department advisor.

ALEC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Special topics in an identified area of international agriculture leadership, education, and communications. May be taken four times for credit.
Prerequisite: Junior or senior classification.

ALEC 491 Research
Credits 1 to 4. 1 to 4 Lecture Hours.
Research conducted under the direction of faculty member in international agricultural leadership, education, and communications. May be taken three times for credit.
Prerequisites: Junior or senior classification; approval of department advisor.

ALEC 494 Internship
Credits 1 to 6. 1 to 6 Other Hours.
Supervised internship and independent study related to the student’s professional interest. May be taken six times for credit.
Prerequisites: Junior or senior classification; approval of departmental advisor.

ALEC - Ag Leadership & Dev (ALED)

ALED 125 Leadership Learning Community I
Credit 1. 1 Lecture Hour.
Offered to students living in the Freshmen Leadership Living Learning Community; fundamentals of developing personal leadership while participating in co-curricular activities; emphasis on the relational model of leadership and global perspective building.
Prerequisites: Freshman classification or approval of instructor; on-campus residence.

ALED 202 Introduction to Leadership
Credits 3. 3 Lecture Hours.
Introduction to the academic and scholarly development of leadership theory and leadership models; investigation of leadership theory when applied to a specific context; development of a leadership definition as an inquiry investigation.

ALED 222 Practicing Diverse Leadership and Cultural Exploration
Credits 3. 3 Lecture Hours.
Social theories and historical perspectives of leadership, particularly in terms of class, gender, race, ethnicity, and nationality; multidisciplinary approach to the study of leadership with a special emphasis on culture completed through readings, class lectures, films, group projects and discussions.
Prerequisite: Membership in the Multicultural Services Culture Leadership, Understanding and Exploration for Sophomores Learning Community.

ALED 223 Practicing Diverse Leadership and Cultural Exploration
Credits 3. 3 Lecture Hours.
Social theories and historical perspectives of leadership, particularly in terms of class, gender, race, ethnicity, and nationality; a multidisciplinary approach to the study of leadership with a special emphasis on culture through experiential learning.
Prerequisites: ALED 222 and membership in the Multicultural Services Cultural Leadership, Understanding, and Exploration for Sophomores Learning Community.

ALED 225 Leadership Learning Community II
Credit 1. 1 Lecture Hour.
Offered to students living in the Freshmen Leadership Living Learning Community; fundamentals of peer mentoring while participating in co-curricular activities; emphasis on building supportive relationships on a college campus.
Prerequisites: Freshman classification or approval of instructor; on-campus residence; ALED 125.

ALED 285 Directed Studies in Agricultural Leadership and Development
Credits 1 to 4. 1 to 4 Other Hours.
Directed study of selected issue in agricultural leadership and development with emphasis on collection, synthesis and interpretation of information.
Prerequisite: Approval of department advisor.

ALED 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Special topics in an identified area of agricultural development. May be repeated for credit.
Prerequisite: Approval of department advisor.
ALED 291 Research
Credits 1 to 4. 1 to 4 Lecture Hours.
Research conducted under the direction of faculty member in agricultural development. May be repeated 2 times for credit. Please see academic advisor in department.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ALED 301 Personal Leadership Education
Credits 3. 3 Lecture Hours.
Development, application and reflection of personal leadership capabilities through self-assessments and experiential learning activities; development of leadership identity through personal leadership inventories including strengths, personality type, values, vision and emotional intelligence.
Prerequisite: ALED or USAL-LED major, junior or senior classification, ALED 202.

ALED 313 Culture Theory, Orientation and Adaptation
Credits 3. 3 Lecture Hours.
Evaluation of culture theory, elements and manifestations of culture, assessing cultural norms of society or groups, adaptation to a new culture for effective leadership.
Prerequisite: Junior or senior classification.

ALED 339 Agricultural Extension Philosophy and the Land-Grant Mission
Credits 3. 3 Lecture Hours.
Philosophy of Cooperative Extension and roles within the land-grant system; history, organization, program areas and guiding principles; relationship with the teaching and research branches of the land-grant system.
Prerequisite: Junior or senior classification or approval of instructor.

ALED 340 Survey of Leadership Theory
Credits 3. 3 Lecture Hours.
Exploration of leadership as a scholarly discipline; critical analysis of evolution of multiple leadership models and theories; synthesis of leadership theory through experiential learning; integration of course content with personal experiences.
Prerequisite: ALED or USAL-LED major, junior or senior classification, ALED 202.

ALED 341 Team Learning
Credits 3. 3 Lecture Hours.
Team development theory; emphasizes research on team member behaviors, team decision making models and positive conflict in team environments.
Prerequisites: ALED 340; junior or senior classification.

ALED 342 Learning Organizations
Credits 3. 3 Lecture Hours.
Social systems language and archetypes; systems thinking theory including mental models, mastery, team learning, concept models of human organizations.
Prerequisites: ALED 340; junior or senior classification.

ALED 343 Human Resource Management in Agriculture and Life Sciences
Credits 3. 3 Lecture Hours.
Principles, theories, concepts, techniques and applications for managing human resources in food and agricultural organizations and in local communities; attracting, staffing, training, developing and compensating human talent. Not intended for majors in business.
Prerequisites: ALED 340; junior or senior classification.

ALED 344 Leadership of Volunteers
Credits 3. 3 Lecture Hours.
Principles, theories, concepts, techniques and applications for leading volunteers in agriculture and life sciences nonprofit, governmental and community organizations.
Prerequisites: ALED 340; junior or senior classification.

ALED 380 Workshop in Agricultural Leadership and Development
Credits 1 to 4. 1 to 4 Lecture Hours.
The study, understanding and solution of human-agricultural problems based on theory learned in the classroom, library, laboratory and fieldwork completed by individuals and teams.
Prerequisite: Junior or senior classification.

ALED 400 Public Leadership Development
Credits 3. 3 Lecture Hours.
Major issues in the study of public leadership, development of leadership skills, and a field investigation done in conjunction with local public leaders.
Prerequisites: Junior classification and approval of instructor.

ALED 401 Advanced Professional Leadership Development
Credits 3. 3 Lecture Hours.
Investigation of the best practices of successful leaders representing various organizational contexts; merging of scholarly mastery of theory with practice.
Prerequisites: Selection for ALED Leadership Fellows Program; ALED 340 or ALED 301; junior or senior classification.

ALED 422 Cultural Pluralism in Agriculture
Credits 3. 3 Lecture Hours.
Selected topics on the diversity of human resources in agriculture; emphasis on working in a multicultural society and developing a sensitivity toward different cultures; explores the interrelationships between the contributions of diverse individuals and the state, nation and global success of agriculture.
Prerequisite: Junior or senior classification.

ALED 424 Applied Ethics in Leadership
Credits 3. 3 Lecture Hours.
Exploration of ethical and moral theories and the application to multiple leadership contexts and situations.
Prerequisites: Junior or senior classification, ALED 301.

ALED 426 Leading and Training Adult Learners
Credits 3. 3 Lecture Hours.
Planning educational training programs, including leadership programs, to implement with an adult audience; includes needs assessment, instructional design, lesson plan development, evaluation and other items related to leading adults.
Prerequisites: ALED or USAL-LED majors only; ALED 340, junior or senior classification.

ALED 440 Leading Change
Credits 3. 3 Lecture Hours.
Analysis of change models and theories and the leadership application on individual, organizational and societal changes.
Prerequisite: ALED or USAL-LED major; junior or senior classification, ALED 202.

ALED 441 Agricultural Extension Organization and Methods
Credits 3. 3 Lecture Hours.
Cooperative extension in agriculture and home economics; development, objectives, organization, program building and methods of teaching.
Prerequisite: Junior or senior classification.
ALED 442 Professional Communications in Agriculture and Life Sciences  
Credits 3. 3 Lecture Hours.  
Technological communication theory; instructional and presentation models; teaching strategies; multimedia development.  
Prerequisite: Junior or senior classification.

ALED 481 Seminar  
Credits 3. 3 Lecture Hours.  
Individual and team approaches to the review of leadership concepts and their application; observation and discussion of current leadership trends and issues.  
Prerequisites: ALED or USAL-LED major; senior classification, ALED 301, ALED 340, ALED 440, ALED 424.

ALED 485 Directed Studies in Agricultural Leadership Development  
Credits 1 to 4. 0 to 4 Lecture Hours. 1 to 4 Other Hours.  
Directed individual study of selected problems in agricultural leadership and development with emphasis on collection, analysis and presentation of information.  
Prerequisites: Junior or senior classification and approval of instructor.

ALED 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Special topics in an identified area of agricultural development. May be repeated for credit.  
Prerequisite: Junior or senior classification.

ALED 491 Research  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Research conducted under the direction of faculty member in agricultural development. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Please see academic advisor in department.  
Prerequisites: Junior or senior classification and approval of instructor.

ALED 494 Internship  
Credits 1 to 6. 1 to 6 Other Hours.  
Supervised internship and independent study related to student’s professional interest.  
Prerequisites: ALED 301; junior or senior classification; 2.0 GPR; approval of instructor.

ANSC - Animal Science (ANSC)

ANSC 107 General Animal Science  
Credits 3. 3 Lecture Hours.  
(AGRI 1319, 1419) General Animal Science. Scientific animal agriculture; selection, reproduction, nutrition, management and marketing of beef cattle, swine, sheep, goats and horses; evaluation and processing of meat, wool and mohair. Importance of livestock and meat industries.  
Prerequisite: Concurrent registration in ANSC 108 required.

ANSC 108 General Animal Science  
Credit 1. 2 Lab Hours.  
(AGRI 1419, AGRI 1119) General Animal Science. Laboratory to accompany ANSC 107.  
Prerequisite: Concurrent registration in ANSC 107 required.

ANSC 117 Texas Barbecue  
Credit 1. 1 Lecture Hour.  
Survey, demonstration and participation in preparation techniques of Texas barbecue; comparison of regional and international barbecue methods.  
Prerequisite: First year students.

ANSC 201 Introductory Equine Care and Use  
Credits 2. 2 Lecture Hours.  
Survey of basic equine care and use; breeds of horses and their use; care and maintenance of equines including feeding, health care, housing and equipment.

ANSC 207 Art and Heritage of Livestock  
Credits 3. 3 Lecture Hours.  
Using art as a venue to understand the legacy and heritage of livestock production and livestock’s contribution to civilization and society; from man as hunter, agriculturalist, and finally, as industrialist; from cave paintings to Russell and Remington; history of the effects of painting, poetry, architecture and sculpture on agriculture.

ANSC 210 Companion Animal Science  
Credits 3. 3 Lecture Hours.  
Types, care, physiology, common diseases and common treatments of companion animals (dogs, cats, exotic pets); careers including biomedical research; solutions for problems such as behavior and overpopulation.  
Prerequisite: ANSC 107.

ANSC 211 Equine Industry and Career Preparation  
Credits 2. 2 Lecture Hours.  
Identify opportunities and skill sets required to pursue a career in the equine industry; development of resume, communication, professional etiquette and interview skills.

ANSC 215 Introduction to Livestock Evaluation  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Live market animal appraisal in relation to carcass and composition; criteria for selection of breeding livestock; techniques for preparation and delivery of oral reason.

ANSC 221 Equine Handling and Safety  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Working around horses safely and effectively; includes equine behavior, proper handling techniques, controlling movement of horses, health assessment and basic management.  
Prerequisite: ANSC 201.

ANSC 230 Animal and Research Experience  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Hands-on experience with farm animals; development and understanding of the scientific method; demonstration of critical thinking skills to evaluate scientific information.

ANSC 242 Growth and Development of Livestock  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Evaluation of slaughter livestock as related to growth and development, production efficiency, carcass value; selection of breeding animals based on performance, production records, visual appraisal; principles of growth biology; biotechnological tools used to manage growth and development.  
Prerequisites: ANSC 107 and ANSC 108.

ANSC 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an indentified area of animal science. May be repeated for credit.  
Prerequisite: Approval of instructor.

ANSC 291 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in animal science. May be repeated 2 times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor; 2.0 GPR in major and overall.
ANSC 302 Basic Beef Cattle Production
Credits 3. 3 Lecture Hours.
Fundamental concepts of beef management and production principles. Service course recommended for non-animal science majors. Prerequisites: ANSC 107 and ANSC 108.

ANSC 303/NUTR 303 Principles of Animal Nutrition
Credits 3. 3 Lecture Hours.
Scientific approach to nutritional roles of water, carbohydrates, proteins, lipids, minerals, vitamins, and other dietary components; emphasis on the comparative aspects of gastrointestinal tracts and on digestion, absorption, and metabolism of nutrients. Prerequisites: ANSC 107 and ANSC 108; CHEM 222 or CHEM 227 or equivalent. Cross Listing: NUTR 303/ANSC 303.

ANSC 305 Animal Breeding
Credits 3. 2 Lecture Hours. 2 Lab Hours.
A systems approach to selection and mating of livestock; gene frequency, heritability, relationship, inbreeding, linebreeding, heterosis, crossbreeding, direct and correlated response to selection, and use of pedigree, family, progeny testing and indices for selection. Prerequisites: ANSC 107 and ANSC 108; GENE 301; STAT 301.

ANSC 307/FSTC 307 Meats
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Integrated studies of the meat animal processing sequence regarding the production of meat-type animals and the science and technology of their conversion to human food. Prerequisites: ANSC 107 and ANSC 108. Cross Listing: FSTC 307/ANSC 307.

ANSC 309 Applied Animal Record Keeping
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Keeping, analyzing and interpreting records to make fully-informed decisions on a day-to-day basis for production and management scenarios; practical application unique to animal science and meat processing. Prerequisite: Junior or senior classification.

ANSC 310 Behavior and Management of Domestic Animals
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of behavior of cattle, horses, sheep, goats and swine to their management; basic principles, physiology of behavior, perception, training, predators, use of dogs in livestock production, stress and animal welfare. Prerequisites: ANSC 107 and ANSC 108.

ANSC 311 Equine Behavior and Training
Credits 3. 1 Lecture Hour. 5 Lab Hours.
Equine behavior and application of principles of psychology to training horses; systematic approaches to horse training emphasizing principles of learning; equipment and its use; stable management and preparation of horses for competition; separate laboratory sections for students with varying backgrounds.

ANSC 312 Equestrian Technology
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Advanced scientific methods and techniques for execution of equine performances in hunter, dressage and stock horse events; anatomical, physiological and psychological implications; preparation of horses and riders.

ANSC 314 Wool Evaluation and Grading
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Evaluation of U.S.D.A. grades for wool and mohair; steps involved in processing raw wool into finished fabric; genetic and environmental factors affecting quality characteristics of wool and mohair; grading, evaluation and selection of fleeces for economic value; oral and written defense of judgments.

ANSC 315 Livestock Judging
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Selection and evaluation of beef cattle, swine, sheep and horses. Ability to present accurate, clear and concise oral and written reasons stressed. Prerequisites: ANSC 107 and ANSC 108; junior or senior classification.

ANSC 316 Equine Selection and Judging
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Detailed evaluation and comparison of horses; selection and critique of athleticism and performance in horses; industry trends addressed; oral and written defense of judgments also explained and expected; required for participation on the Horse Judging Team. Prerequisite: Junior or senior classification or approval of instructor.

ANSC 317 Meat Selection, Evaluation and Grading
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Selection and grading of carcasses and wholesale cuts of beef, pork and lamb; principles of evaluation included in carcass contests and progeny testing. Prerequisites: ANSC 107 and ANSC 108.

ANSC 318 Feeds and Feeding
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Characteristics of feedstuffs used in livestock enterprises; manual and computer ration formulation procedures and life cycle nutritional management of beef, swine, sheep, dairy, horses, fish and pets; methods of grain, protein supplement and forage processing and evaluation; commercial and on-the-farm feed mixing methods and feed control laws. Prerequisite: ANSC 303/NUTR 303.

ANSC 320 Animal Nutrition and Feeding
Credits 3. 3 Lecture Hours.
Nutritional functions of water, protein, carbohydrates, fats, minerals and vitamins and their digestion, absorption, use and excretion; energy, protein and forage feedstuff characteristics and processing; nutritional requirements, ration formulation and feeding methods for farm animals; general course for non-animal science majors. Prerequisite: Junior or senior classification or approval of instructor; restricted to students in the college of agriculture and life sciences.

ANSC 325 Advanced Livestock and Product Evaluation
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Advanced evaluation of cattle, swine, sheep and equine; products produced or associated with each species; advanced oral or written defense of judgments associated with changing trends in these industries. May be repeated three times for credit. Prerequisite: Junior or senior classification.

ANSC 335 Purebred Beef Cattle Management
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Information and skills needed to be successful in the production, management and merchandising of purebred beef cattle; purpose and organization of the purebred beef cattle industry, and career opportunities in the industry. Prerequisite: Junior or senior classification.
ANSC 337 Meat Merchandising  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Steps of meat processing and merchandising of retail and foodservice;  
merchandising practices such as selection, identification, fabrication,  
pricing, packaging and distribution.  
Prerequisites: ANSC 307/FSTC 307; junior or senior classification.

ANSC 351 Current issues in Animal Agriculture  
Credits 3. 3 Lecture Hours.  
Preparation to project a professional image and the use of  
communication skills to describe animal agriculture; converse about the  
strengths and weaknesses of animal agriculture.  
Prerequisite: Junior or senior classification.

ANSC 402 Exploring Animal Industries  
Credits 2. 2 Lecture Hours.  
Instruction for students nearing the end of their undergraduate studies;  
thoretical understanding of organizations and human resources  
available to students; awareness and understanding of the job  
application process, resume and cover letter writing; networking,  
professional and business attire; ethics related to job searches and  
retention.  
Prerequisite: Junior or senior classification.

ANSC 406 Beef Cattle Production and Management  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Basic principles and methods of application involved in breeding, feeding,  
management, marketing and disease control in cow-calf production.  
Prerequisites: ANSC 303/NUTR 303, ANSC 318, ANSC 433; junior or  
senior classification.

ANSC 408 Management of Stocker and Feedlot Cattle  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Basic principles involved in feeding, management, marketing and disease  
control of stocker and feeder cattle from weaning through slaughter for  
economical production of beef.  
Prerequisites: ANSC 318; junior or senior classification.

ANSC 411 Equine Nutrition and Health  
Credits 3. 3 Lecture Hours.  
Designed to provide knowledge of nutrition and health in the horse;  
gastrointestinal anatomy, nutrient utilization, feeding management and  
nutritional requirements; metabolic diseases, infectious diseases, internal  
and external parasites, and herd health management.  
Prerequisite: Junior or senior classification.

ANSC 412 Swine Production and Management  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Basic principles and their practical application in efficient, economical  
pork production; all areas of production—breeding and selection,  
nutrition, housing and equipment, marketing, herd health and economic  
management.  
Prerequisites: Junior or senior classification or approval of instructor.

ANSC 414 Sheep and Goat Production and Management  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Application of basic principles of genetics, physiology and nutrition to  
practical sheep and angora goat production systems; management,  
health care and marketing of animals and fiber.  
Prerequisites: Junior or senior classification or approval of instructor.

ANSC 415 Brazil: Comparative Ruminant Production  
Credits 3. 3 Lecture Hours.  
Contrast two scenarios of ruminant production in Brazil; the effects of  
globalization on the two different production systems.  
Prerequisites: ANSC 303/NUTR 303 or ANSC 320 or approval of  
instructor.

ANSC 418 Equine Exercise Physiology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Changes within the systems of the horse resulting from the physical  
stresses of exercise, adaptations of systems in response to a training  
regimen; methodology for measuring improvement in physical condition;  
foundation for development of training programs for horses in moderate,  
intense or prolonged performance activities.  
Prerequisites: Junior or senior classification and approval of instructor.

ANSC 419 Equine Reproduction  
Credits 3. 3 Lecture Hours.  
Reproductive anatomy of the stallion and mare; industry and scientific  
practices; comprehensive analysis of the body of scientific research;  
development of critical thinking ability to assess and discuss previous  
research in comparison of needed research.  
Prerequisites: ANSC 201 and junior or senior classification or approval of  
instructor.

ANSC 420 Equine Production and Management  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Application of biological and biotechnological principles and concepts in  
areas including genetics, breeding, nutrition, reproduction, immunology,  
parasitology, anatomy and exercise physiology to efficient production of  
horses for market; management of equine enterprises.  
Prerequisites: ANSC 201 and ANSC 433; junior or senior classification.

ANSC 421 Stock Horse Advanced Training  
Credits 3. 3 Lecture Hours. 2 Lab Hours.  
Theory and practice of applying scientific principles of psychology  
and behavior modification to advanced training of the stock horse;  
exercise conditioning and humane training methods to maximize learning  
effectiveness; current industry trends for preparing horses and showing  
in stock horse events.  
Prerequisites: ANSC 311 and previous riding experience.

ANSC 423 Issues in the Equine Industry  
Credits 3. 3 Lecture Hours.  
Integration of cumulative knowledge acquired in the equine science  
curriculum to demonstrate critical thinking and communication skills to  
address critical issues in the equine industry.  
Prerequisites: Junior or senior classification, approval of instructor.

ANSC 424 Equine Sales Management  
Credits 3. 3 Lecture Hours.  
Hands-on horse sale management experience through planning and  
conducting the Texas A&M University Department of Animal Science  
Horse Sale.  
Prerequisite: Junior or senior classification and approval of instructor.

ANSC 431 Equine Marketing and Development  
Credits 3. 3 Lecture Hours.  
Scope of domestic and international equine industry; safe handling  
and transport of horses for export or import; career opportunities in the  
equine field.  
Prerequisite: Junior or senior classification or approval of instructor.
ANSC 433 Reproduction in Farm Animals
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Physiological principles of reproductive processes in cattle, sheep, swine and horses including sperm and ova production, estrus, fertilization, gestation and parturition; techniques of semen evaluation and storage, estrous synchronization, embryo transfer and pregnancy determination.
Prerequisite: Junior classification.

ANSC 434 Animal Reproduction Management
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Available and emerging technologies; strategies including artificial insemination, embryo manipulation and transfer, control of ovulation, sex ratio manipulation and animal cloning for managing the reproductive function of farm animals; hands-on sessions using available technologies including artificial insemination of cattle.
Prerequisite: ANSC 433, priority enrollment given to graduating seniors in animal science.

ANSC 436 Texas Panhandle Beef Production Tour
Credits 2. 2 Lecture Hours.
Facets of beef production from cow/calf operations to retail product; experiential knowledge of technologies and practices to enhance efficiency to enlighten students regarding the array of career opportunities in the beef production industry.
Prerequisites: Junior or senior classification or approval of instructor.

ANSC 437 Marketing and Grading of Livestock and Meats
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Study of USDA livestock and carcass grades; understanding current market trends for beef, pork, lamb and goat; review of branded and certified programs; principles applied in contracting, breakeven determination, hedging, and grid or formula pricing.
Prerequisite: Junior or senior classification.

ANSC 439 Feedlot Risk Management
Credits 2. 2 Lecture Hours.
Advanced study of livestock marketing techniques; cash sales, video sales, futures and options markets, forward contracting; problem solving in real-time livestock marketing situations; risk of ownership of hypothetical livestock operations.
Prerequisites: Junior or senior classification or approval of instructor.

ANSC 447 Advanced Meat Science and Technology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Advanced basic and applied studies of meat science and/or technology utilizing the underlying physiological and structural components for conversion to human food; understanding the influence of pre- and post-harvest factors on meat quality, composition, color, packaging, sensory and preparation factors; applying scientific and business principles to manufacturing and process flow of commercial meat food products and demonstrating knowledge of these principles through development of meat products.
Prerequisites: ANSC 307/FSTC 307; CHEM 222 or approval of instructor; junior or senior classification.

ANSC 457/FSTC 457 Hazard Analysis and Critical Control Point System
Credits 3. 3 Lecture Hours.
Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices and standard operating procedures development.
Prerequisite: FSTC 326/DASC 326 or approval of instructor.
Cross Listing: FSTC 457/ANSC 457.

ANSC 470/FSTC 470 Quality Assurance for the Food Industry
Credits 3. 3 Lecture Hours.
Principles of food system process control including statistical process control (SPC) and the tools required to assure uniform communication and understanding of quality assurance systems.
Prerequisite: Junior or senior classification.
Cross Listing: FSTC 470/ANSC 470.

ANSC 481 Seminar
Credit 1. 1 Lecture Hour.
Review of literature and research problems related to the livestock and food industries; preparation of a technical report including an oral presentation supported by a written technical paper.
Prerequisite: Senior classification.

ANSC 484 Livestock Practicum
Credit 1. 2 Other Hours.
Provides an opportunity to learn skills required in livestock production; planned for students who have had limited farm and ranch experience in one or more species.
Prerequisite: Junior or senior classification in animal science or approval of instructor.

ANSC 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of selected problem in field of animal science.
Prerequisites: Junior or senior classification; written approval of professor supervising the activity; 2.0 GPR in major and overall.

ANSC 487/FSTC 487 Sensory Evaluation of Foods
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of sensory science principles and practices to food systems including an understanding of discriminative, descriptive and consumer sensory techniques.
Prerequisites: CHEM 222 or CHEM 227; junior or senior classification.
Cross Listing: FSTC 487/ANSC 487.

ANSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 8 Lab Hours.
Selected topics in an identified area of animal science. May be repeated for credit.
Prerequisite: Junior or senior classification.

ANSC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in animal science. May be repeated 3 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisite: Junior or senior classification and approval of instructor; 2.0 GPR in major and overall.

ANSC 494 Animal Science Internship
Credits 0 to 5. 0 to 5 Other Hours.
Independent study and supervised field experience related to the student's professional interest.
Prerequisites: Junior or senior classification or approval of instructor; 2.0 GPR in major and overall.
ANTH - Anthropology (ANTH)

ANTH 201 Introduction to Anthropology
Credits 3.3 Lecture Hours.
(ANTH 2346, HUMA 2323) Introduction to Anthropology. An introduction to the discipline of anthropology through the examination of its four subfields: archaeology, physical anthropology, sociocultural anthropology and linguistics.

ANTH 202 Introduction to Archaeology
Credits 3.3 Lecture Hours.
(ANTH 2302) Introduction to Archaeology. An introduction to the study of the human past through the retrieval, analysis, and interpretation of material remains.

ANTH 204 The Prehistoric World
Credits 3.3 Lecture Hours.
Exploration of the development of human societies and world prehistory from the beginnings of humanity more than two million years ago to emergence of complex civilizations.

ANTH 205 Peoples and Cultures of the World
Credits 3.3 Lecture Hours.
Survey of human cultures around the world using case studies of customs and cultural organization; case studies exemplifying contrasting types of cultures and societies.

ANTH 210 Social and Cultural Anthropology
Credits 3.3 Lecture Hours.
(ANTH 2351) Social and Cultural Anthropology. Evolution of cultures; differences, similarities and effects of material and non-material culture on economic, social and political organization.

ANTH 225 Introduction to Biological Anthropology
Credits 3.3 Lecture Hours. 0 Lab Hours.
Study of human biology including an examination of evolutionary processes acting on human populations; human genetics; non-human primate anatomy, classification and ecology of primates; the primate paleontological record, and human variation and adaptation. Concurrent registration in ANTH 226 recommended.

ANTH 226 Introduction to Biological Anthropology Laboratory
Credit 1.0 Lecture Hours. 3 Lab Hours.
Exploration of basic evolutionary principles through population genetics; hands-on exposure to the fossils of primate and human evolution along with opportunity to measure, compare, contrast and observe trends that have occurred throughout the Cenozoic era. Concurrent registration in ANTH 225 is recommended.

ANTH 229 Introduction to Folklore
Credits 3.3 Lecture Hours.
Study of folklore through selected examples of traditional cultures, their beliefs, customs and art forms such as: tales, folksongs, proverbs, riddles and material culture.

ANTH 285 Directed Studies
Credits 0 to 3.0 to 3 Other Hours.
For individual research in anthropology on subjects not included in established courses. May be taken two times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ANTH 289 Special Topics In...
Credits 1 to 4.1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of anthropology. May be repeated for credit.

ANTH 291 Research
Credits 0 to 3.0 to 3 Other Hours.
Research conducted under the direction of a faculty member in Anthropology. May be taken two times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ANTH 300 Cultural Change and Development
Credits 3.3 Lecture Hours.
Anthropological strategies for the study of cultural change and the implication of these strategies for the development of Western and non-Western societies.

ANTH 301 Indians of North America
Credits 3.3 Lecture Hours.
Native North American cultures from the Arctic to Mesoamerica; their origins, cultures prior to extensive acculturation and their contemporary situations.

ANTH 302 Archaeology of North America
Credits 3.3 Lecture Hours.
Overview of archaeology and prehistory of North America from the arrival of humankind through the development of agriculture to Euro-American contact.
Prerequisite: ANTH 201, ANTH 202, ANTH 205 or ANTH 210.

ANTH 303 Archaeology of the American Southwest
Credits 3.3 Lecture Hours.
Overview of archaeology and prehistory of the southwestern United States and northern Mexico from the earliest evidence of human occupation to the Spanish conquest.
Prerequisite: ANTH 201, ANTH 202, ANTH 205 or ANTH 210.

ANTH 305 Fundamentals of Anthropological Writing
Credit 1.1 Lecture Hour.
Basic types of writing expected of anthropology students; emphasis on the subject matter of an upper-division anthropology course in which the student is currently enrolled.
Prerequisites: Junior or senior classification and co-enrollment in another upper-division anthropology course (the "companion course").

ANTH 308 Archaeology of Mesoamerica
Credits 3.3 Lecture Hours.
Development of Indian civilizations in Mexico and Guatemala, including prehistory of the Olmec, Maya, Aztec and other regional cultures to the time of the Spanish conquest.

ANTH 312 Fossil Evidence of Human Evolution
Credits 3.3 Lecture Hours.
Detailed review of fossil antecedents of humans including theoretical implications for an understanding of human evolution.
Prerequisite: ANTH 225 or approval of instructor.

ANTH 313 Historical Archaeology
Credits 3.3 Lecture Hours.
Use and methods of historical archaeology in locating, documenting, restoring and preserving our historical resources.

ANTH 314 Agrarian Peasant Societies
Credits 3.3 Lecture Hours.
Major adaptations among traditional agricultural peoples of the world; production and marketing organization; culture of the village; ties between peasants and the nation; contemporary changes in traditional life.
ANTH 316 Nautical Archaeology
Credits 3. 3 Lecture Hours.
Nautical Archaeology Underwater shipwrecks, sunken harbors, and other submerged evidence of human activities; relationship to cultural geography in general; problems of diving technology, surveying and preservation; relevance to modern problems.
Prerequisite: Junior or senior classification.

ANTH 317/RELS 317 Introduction to Biblical Archaeology
Credits 3. 3 Lecture Hours.
Application of archaeology in biblical research; basic overview of the material cultures that are the setting for the biblical narratives.
Cross Listing: RELS 317/ANTH 317.

ANTH 318 Nautical Archaeology of the Americas
Credits 3. 3 Lecture Hours.
Seafaring in the Americas from the 16th to the 20th centuries based on shipwreck archaeology; ship construction, exploration, commerce, naval warfare and related activity; influence of seafaring on the cultures, economics and history of the Western Hemisphere.

ANTH 323 Nautical Archaeology of the Mediterranean
Credits 3. 3 Lecture Hours.
The archaeology of ancient seafaring in the Mediterranean from the Stone Age through the Roman Empire.
Prerequisite: Junior or senior classification.

ANTH 324/MUSC 324 Music in World Cultures
Credits 3. 3 Lecture Hours.
Examination of music from an ethnomusicological perspective focusing on musical performance and the complex interrelationship of music to culture, society and daily life; examination of music from a variety of cultures through a series of case studies.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: MUSC 324/ANTH 324.

ANTH 330 Field Research in Anthropology
Credits 1 to 9. 1 to 9 Other Hours.
Training for students in formulating and solving anthropological problems through field research; problem oriented field research under supervision.
Prerequisites: 6 hours of anthropology; approval of instructor.

ANTH 335/ASIA 335 Cultures of Central Asia
Credits 3. 3 Lecture Hours.
Study of anthropological research in Central Asia: ecological adaptations; colonialism and post-colonialism; ethnic politics and ethnic conflict; religion and identity; gender and family; globalization and modernization.
Prerequisite: Junior or senior classification.
Cross Listing: ASIA 335/ANTH 335.

ANTH 340/RELS 340 Folklore and the Supernatural
Credits 3. 3 Lecture Hours.
Traditional expressions of the supernatural such as superstition, belief tale and divination classified as folklore genres and their relationships to the cultures in which they develop; theories drawn from anthropology, folklore and related social sciences.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: RELS 340/ANTH 340.

ANTH 350/ASIA 360 Archaeology of the Old World
Credits 3. 3 Lecture Hours.
Overview of archaeology and prehistory of Europe, Africa and Asia from the evolution of the hominids to the development of agriculture and the rise of civilization.
Cross Listing: ASIA 360/ANTH 350.

ANTH 351 Classical Archaeology
Credits 3. 3 Lecture Hours.
Origins and spread of Western civilization through the material remains of Minoan, Mycenaen, Etruscan, and early Greek and Roman cultures.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 353/CLAS 353 Archaeology of Ancient Greece
Credits 3. 3 Lecture Hours.
Archaeology of ancient Greece from the Stone Age until the ascent of Rome in the Hellenistic Period; remains of ancient Greek art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figureines, votive offerings), and social history (coins, inscriptions).
Prerequisite: Junior or senior classification.
Cross Listing: CLAS 353/ANTH 353.

ANTH 354/CLAS 354 Archaeology of Ancient Italy
Credits 3. 3 Lecture Hours.
Archaeology of ancient Italy from the Stone Age until the collapse of the Roman Empire in the fourth century; remains of ancient Etruscan and Roman art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figureines, votive offerings), and social history (coins, inscriptions).
Prerequisite: Junior or senior classification.
Cross Listing: CLAS 354/ANTH 354.

ANTH 360 Ancient Civilizations of the World
Credits 3. 3 Lecture Hours.
Explores recent discoveries and efforts by archaeologists to understand the rise and fall of states and civilizations that emerged in the Near East, Africa, India, Europe, China, Mesoamerica, and Peru between 3500 BCE and 1500 CE.
Prerequisite: Junior or senior classification.

ANTH 370 Cultural Diversity and Ethics
Credits 3. 3 Lecture Hours.
Examination of the cultural construction of ethical values and how cultural diversity, including beliefs, values and ways of doing business may impact science, technology and engineering projects; focus on developing a holistic, social-science mindset and application of critical thinking skills.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 401 Ice Age Humans in North America
Credits 3. 3 Lecture Hours.
Archaeological, environmental and geological evidence related to the timing of human entry into the Americas and megaфаunal extinctions at the end of the Pleistocene.
Prerequisite: ANTH 202 or equivalent.

ANTH 402 Archaeological Artifact Conservation
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Analysis of the treatments for artifacts of clay, stone, glass, wood, shell, bone, fiber and metal from archaeological excavations or ethnographic, and historic collections presented in an integrated series of lectures and hands-on laboratory experience.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 403/RELS 403 Anthropology of Religion
Credits 3. 3 Lecture Hours.
Anthropological approach to religion and to the relationship between religion, economics, politics and social structure with particular reference to non-Western, preindustrial societies.
Cross Listing: RELS 403/ANTH 403.
ANTH 404/WGST 404 Women and Culture
Credits 3. 3 Lecture Hours.
Examines women's lives in evolutionary and cross-cultural perspective; women's roles in subsistence, politics, religion and economics in traditional cultures; women's roles in international development; the cultural and social construction of women's biology cross-culturally including circumcision, menstruation, pregnancy, childbirth and motherhood.
Cross Listing: WGST 404/ANTH 404.

ANTH 405 Introduction to the Primates
Credits 3. 3 Lecture Hours.
Survey of nonhuman primates from ecological and evolutionary perspectives covering numerous topics including: taxonomy; primate evolution; behavioral observation; reproductive strategies; diet; and conservation.
Prerequisite: Junior or senior classification.

ANTH 409 Science, Pseudoscience and Critical Thinking in Anthropology
Credits 3. 3 Lecture Hours.
Close scrutiny of fantastic claims made across a broad spectrum of media regarding anthropology, biological anthropology and archaeology; distinction of science from pseudoscience; critical evaluation of scientific and pseudoscientific research; evaluation of media portrayal of science; development of critical thinking skills for skeptical investigation of extraordinary claims.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 410 Anthropological Theory
Credits 3. 3 Lecture Hours.
A systematic examination of the basic principles of anthropology.
Prerequisite: ANTH 210.

ANTH 412 Archaeological Theory
Credits 3. 3 Lecture Hours.
History of scientific archaeological exploration; major theoretical paradigms and movements in archaeological theory; current trends in archaeology; intellectual developments from other disciplines that influenced archaeological thought.
Prerequisites: Junior or senior classification, ANTH 202 or approval of instructor.

ANTH 415 Anthropological Writing
Credits 3. 3 Lecture Hours.
Reading and discussion of the classic genres of anthropological literature; instruction in writing styles and techniques appropriate to each genre, followed by guided writing assignments.
Prerequisite: Junior or senior classification.

ANTH 417/CLAS 417 Naval Warfare and Warships in Ancient Greece and Rome
Credits 3. 3 Lecture Hours.
Extensive survey of Greek and Roman warships, naval warfare, naval strategy and tactics drawing upon archaeological evidence, literary documentation and iconographic material, from the Bronze Age (Ancient Egypt and the mythical Trojan War) to the Imperial Roman Navy.
Prerequisite: Junior or senior classification.
Cross Listing: CLAS 417/ANTH 417.

ANTH 418 Romans, Arabs, and Vikings--Seafaring in the Mediterranean during the early Christian Era
Credits 3. 3 Lecture Hours.
Examination of seafaring, maritime commerce, naval affairs, and shipbuilding in the Mediterranean from the late Roman Period until the fall of Constantinople in 1453.
Prerequisite: Junior or senior classification.

ANTH 419 Indians of Texas
Credits 3. 3 Lecture Hours.
Study of diverse native/immigrant Texas Indian lifeways/cultures from late pre-European to contemporary times; exploration of historical underpinnings, traditional cultures, especially land-use patterns; assessment of tribal relationships with colonial powers, U.S., and Texas governments as evidenced in ethnographic, ethnohistoric, and historical materials; application toward anthropological, archaeological, and human ecology research.
Prerequisites: Junior or senior classification; ANTH 201; and ANTH 301 or ANTH 302 or ANTH 303 or HIST 258; or HIST 308 or approval of instructor.

ANTH 421 Museums and Their Functions
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Role of museums, those specializing in natural history and the extent to which they serve the community, state, nation, and the advancement of the sciences included in their programs; history, operations, methods and programs.
Prerequisite: Junior or senior classification.

ANTH 423 Bioarchaeology
Credits 3. 3 Lecture Hours.
Role of human skeletal studies in reconstructing the biological and cultural past of humans; evidence gleaned from human skeletal remains recovered from archaeological sites such as data regarding diet, health, genetics and migration.
Prerequisites: ANTH 225; junior or senior classification.

ANTH 424 Human Evolutionary Ecology: Culture and Cooperation
Credits 3. 3 Lecture Hours.
Examination of evolutionary perspective to explore culture, cooperation and sociality and subsistence behaviors across a wide variety of human cultures; part of the Human Evolutionary Ecology series along with ANTH 434.
Prerequisite: Junior or senior classification.

ANTH 425 Human Osteology
Credits 3. 3 Lecture Hours.
Role of human skeletal studies in reconstructing the biological and cultural past of humans; evidence gleaned from human skeletal remains recovered from archaeological sites such as data regarding diet, health, genetics and migration.
Prerequisites: ANTH 225 or VIBS 305; junior or senior classification.

ANTH 426 Anthropology of Food and Nutrition
Credits 3. 3 Lecture Hours.
Anthropological study of human foodways and their nutritional consequences; how environmental, biological and cultural factors interact to produce patterns of food intake, and the effects of such patterns on health, growth and fertility; examples drawn primarily from non-Western societies.
Prerequisite: ANTH 201 or ANTH 210 or ANTH 225 or NUTR 202 or approval of instructor.

ANTH 427 Human Variation
Credits 3. 3 Lecture Hours.
Biological basis of variation in the physical features of modern humans; details of anatomical and physiological differences of living populations to understand their adaptive and historical significance; history of human variation studies rooted in the historical notion of "race."
Prerequisites: ANTH 225, BIOL 214 or 225; junior or senior classification.
ANTH 430 Applied Anthropology
Credits 3. 3 Lecture Hours.
Theory, ethics and practical applications of anthropological methods and concepts as they relate to planned programs of sociocultural change.
Prerequisites: ANTH 210; junior or senior classification.

ANTH 434 Human Evolutionary Ecology: Reproduction and Parenting
Credits 3. 3 Lecture Hours.
Evolutionary ecology perspective on family-formation patterns, sexuality, reproduction and parenting of humans throughout the life course and across different cultures; part of a Human Evolutionary Ecology series along with ANTH 424.
Prerequisites: Junior or senior classification.

ANTH 435 Medical Anthropology
Credits 3. 3 Lecture Hours.
Overview of medical anthropology which examines the biological and cultural basis of health and disease in order to understand the influence of culture on the illness experience and treatment.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 436/RELS 436 Ancient Egypt
Credits 3. 3 Lecture Hours.
Archaeology and history of ancient Egypt from earliest times to the end of the New Kingdom period.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 437 Ethnobotany
Credits 3. 3 Lecture Hours.
Interdisciplinary study of the complex and dynamic relationships that exist between people and plants.
Prerequisite: Junior or senior classification or approval of instructor.

ANTH 439/WGST 439 Gender, Ethnicity and Class in Archaeological Research
Credits 3. 3 Lecture Hours.
Exploration of theoretical and methodological issues in engendering archaeology; ideological biases in the interpretation of roles attributed to women, men, and underrepresented groups in the past; the impact of cultural transformation on underrepresented groups and gender relations; and the formulation of research questions concerning these issues.
Prerequisites: ANTH 202, ANTH 210, WGST 200 or WGST 207/SOCI 207; junior or senior classification or approval of instructor.

ANTH 440 Studies in Globalization
Credits 3. 3 Lecture Hours.
Selected issues on the anthropology of globalization such as the impact of global circulations of media, money and people on local cultures, identities and politics, migration and political economy. May be taken three times for credit.
Prerequisites: Junior or senior classification or approval of instructor.

ANTH 444/CLAS 444 Classical Archaeology
Credits 3. 3 Lecture Hours.
History of the discipline through the individuals, organizations, excavations, theoretical models and ethical issues that have shaped it.
Prerequisites: Junior or senior classification; ANTH 353/CLAS 353, ANTH 354/CLAS 354, CLAS 353/ANTH 353 or CLAS 354/ANTH 354.
Cross Listing: CLAS 444/ANTH 444.

ANTH 445 Studies in African Diaspora
Credits 3. 3 Lecture Hours.
Examination of topics related to global African diaspora including African descent populations outside of Africa wherever found (the Americas, the Caribbean, Europe, Asia, etc.); construction of blackness in Latin America; diversity of past and present African descent populations in the Old World; social and political mobilization; religion; popular culture; cultural politics; politics of identity. May be taken three times for credit.
Prerequisite: Junior or senior classification.

ANTH 446 Ceramic Artifact Analysis
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Concepts, methods, and approaches used in the analysis of archaeological pottery with a focus on the techniques and theories used to bridge the gap between the recovery of ceramic artifacts and their interpretation within various anthropological contexts.
Prerequisite: ANTH 202 and approval of instructor; junior or senior classification.

ANTH 447 Lithic Artifact Analysis
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Laboratory-based course reviewing methods archaeologists use to analyze stone tools and debitage, including identification of tool-stone sources, reconstruction of technology, interpretation of tool variability, and microscopic use-wear analysis.
Prerequisite: ANTH 202 and approval of instructor; junior or senior classification.

ANTH 448 Quantitative Ethnographic Methods
Credits 3. 3 Lecture Hours.
Quantitative data collection and analytical methods employed by anthropologists; includes standardized observation, structured interviews, demography and network analysis; hands-on assignments involving data collection among local community.
Prerequisite: Junior or senior classification.

ANTH 449 Environmental Archaeology
Credits 3. 3 Lecture Hours.
Exploration of the paleoecological context in which past humans interacted with the natural environment encompassing plants, animals and landscape; advanced method, theory and applications in paleoenvironmental reconstruction.
Prerequisites: ANTH 202 or approval of instructor; junior or senior classification.

ANTH 450 Directed Studies
Credits 0 to 3. 0 to 9 Other Hours.
For individual research in anthropology on subjects not included in established courses.
Prerequisite: Junior or senior classification or approval of instructor.
Anthropology. May be repeated for credit.

Prerequisite: Approval of instructor.

**Anthropology 491**

Research conducted under the direction of a faculty member in Anthropology. May be taken two times for credit.

**Credits 6. 6 Lecture Hours.**

**Arabic (ARAB)**

**ARAB 101 Beginning Arabic I**

Credits 4. 4 Lecture Hours.

(ARAB 1411) Beginning Arabic I. Introduction to Modern Standard Arabic in its written and spoken forms; emphasis on conversation, rudimentary vocabulary, simple grammar, and reading.

**ARAB 102 Beginning Arabic II**

Credits 4. 4 Lecture Hours.

(ARAB 1412) Beginning Arabic II. Introduction of more complex grammatical constructions; vocabulary building; emphasis on putting acquired vocabulary and grammar to conversational use.

**Prerequisite:** ARAB 101 or equivalent.

**ARAB 104 Intensive Beginning Arabic**

Credits 8. 8 Lecture Hours.

Accelerated elementary language study, with oral, listening, reading and writing practice. Equivalent to ARAB 101 and ARAB 102.

**ARAB 201 Intermediate Arabic I**

Credits 3. 3 Lecture Hours.

(ARAB 2311). Practice of listening, speaking and writing skills; vocabulary building; discussion of topics related to daily life and general aspects of Arab culture.

**Prerequisite:** ARAB 102 or ARAB 104, or equivalent.

**ARAB 202 Intermediate Arabic II**

Credits 3. 3 Lecture Hours.

(ARAB 2312) Intermediate Arabic II. Emphasis on comprehending printed material, perfecting pronunciation, and attending to more complex grammar; discussion of topics holding general and professional interest; knowledge of Arab culture and history.

**Prerequisite:** ARAB 201 or equivalent.

**ARAB 204 Intensive Intermediate Arabic**

Credits 6. 6 Lecture Hours.

Accelerated intermediate language study, with oral, listening, reading and writing practice. Equivalent to ARAB 201 and ARAB 202.

**Prerequisite:** ARAB 202 or ARAB 204.

**ARAB 221 Introduction to Arabic Language and Society**

Credits 3. 3 Lecture Hours.

Examination of critical linguistic issues in the Arab world from a sociolinguistic perspective, including language and religion; language and power; language and nationalism; and language and education.

**Prerequisite:** Approval of instructor.

**ARAB 222 Field Studies I: Language, Culture, and Society**

Credits 3. 3 Lecture Hours.

Arabic language and culture taught in an Arabic-speaking country; living with a host family; supervised travel of cultural interest; participation in activities of host institution.

**Prerequisite:** ARAB 102 or ARAB 104, or equivalent.

**ARAB 223 Field Studies II: Language, Culture, and Society**

Credits 3. 3 Lecture Hours.

Arabic language and culture taught in an Arabic-speaking country; living with a host family; supervised travel of cultural interest; participation in activities of host institution.

**Prerequisite:** ARAB 202 or ARAB 204, or equivalent. Junior or senior classification or approval of instructor.

**ARAB 285 Directed Studies**

Credits 1 to 4. 1 to 4 Other Hours.

Individual supervision of readings or assigned projects in an Asian Language, selected for each student individually; written or oral reports.

**Prerequisite:** Approval of Arabic and Asian Language Office Director.

**ARAB 289 Special Topics in...**

Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.

Selected topics in an identified area of Arabic studies. May be repeated for credit.

**Prerequisite:** Approval of instructor.

**ARAB 301 Reading and Composition**

Credits 3. 3 Lecture Hours.

Advanced Arabic grammar and readings of average difficulty and of different genres, including literary and journalistic texts and other culturally-enriched materials in order to develop awareness of cultural products, perspectives, and practices found in the Arab world.

**Prerequisites:** ARAB 202 or ARAB 204, or equivalent; junior or senior classification or approval of instructor.

**ARAB 302 Reading and Composition II**

Credits 3. 3 Lecture Hours.

Readings of average difficulty and of different genres, including literary and journalistic texts and other culturally-enriched materials; development of writing skills with emphasis on grammatical constructions; expansion of vocabulary and oral expression.

**Prerequisites:** ARAB 301; junior or senior classification or approval of instructor.

**ARAB 321 Business Arabic**

Credits 3. 3 Lecture Hours.

Business and financial terminologies useful in the Arab World; cultural etiquette for effective communication in Arabic business settings; oral and written business reports from a variety of authentic sources; language skills and communication strategies for traveling, shopping and conducting financial transactions in the Arab World.

**Prerequisite:** ARAB 202 or ARAB 204, or equivalent. Junior or senior classification or approval of instructor.

**ARAB 322 Field Studies II: Language, Culture, and Society**

Credits 3. 3 Lecture Hours.

Arabic language and culture taught in an Arabic-speaking country; living with a host family; supervised travel of cultural interest; participation in activities of host institution.

**Prerequisite:** ARAB 202 or ARAB 204, or equivalent. Junior or senior classification or approval of instructor.

**ARAB 323 Media Arabic**

Credits 3. 3 Lecture Hours.

Analysis of current events in the Arab World; use of print and electronic materials in Arabic from variety of media sources; discussion of different points of view in media representation/coverage; issues pertaining to business, politics, culture and entertainment in the Arab World.

**Prerequisite:** ARAB 202 or ARAB 204, or equivalent. Junior or senior classification or approval of instructor.

**ARAB 475 Media and the Middle East**

Credits 3. 3 Lecture Hours.

Examination of how media (e.g., literature, news, film, television) contribute to our understanding of historical events in the Middle East; analysis of cultural, social, political and historical circumstances of media representation of events; exploration of various media genres’ techniques and narrative structure. May be taken two times for credit with a focus on different medium.

**Prerequisite:** Junior or senior classification or approval of instructor.
ARCH - Architecture (ARCH)

ARCH 205 Architecture Design I
Credits 4. 1 Lecture Hour. 9 Lab Hours.
Issues and methods in designing environments for human habitation and well-being; projects addressing site, functional planning, spatial ordering, form generation through a recognition of the synthesis of space, structure, use and context; reinforcement of appropriate graphic and model building techniques.
Prerequisites: ENDS 105, ENDS 108, ENDS 115.

ARCH 206 Architecture Design II
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Fundamental issues of innovative design processes and creation explored through the creative use of past, present and future materials, tools, and technologies; with an emphasis upon the research of materials, methods, scale, craft and technique as instruments of design, fabrication, and production.
Prerequisites: ARCH 205, ENDS 105, ENDS 108, ENDS 115.

ARCH 207 Architecture Design II
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Technology as medium for design planning and communication; impact and influence of technology on architectural design process; investigation of computing theories, systems, methods and current and future trends through creative thinking and innovation design, problem solving and creation with the use of digital media.
Prerequisites: ARCH 205 and ENDS 105, ENDS 106, ENDS 115, ENDS 116.

ARCH 212 Social and Behavioral Factors in Design
Credits 3. 3 Lecture Hours.
Social and behavioral factors in the built and natural environment; environmental perception and spatial cognition; social-environmental processes such as privacy and crowding; setting-oriented discussion on residences, education, and the workplace; the psychology of nature and natural resource management; social design and social science contribution to architectural design.

ARCH 213 Sustainable Architecture
Credits 3. 3 Lecture Hours.
A comprehensive introduction to sustainability concepts, techniques and applications at all levels of the built environment, history of contemporary development of sustainable architecture from 1960 to the present; design strategies, environmental technologies and social factors for reducing building energy needs and carbon foot prints; global applications of sustainable approaches.

ARCH 216 Computational Methods in Architecture
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Software and processes for computation design in architecture; image editing and creation, vector drawing, 3D modeling, parametric modeling, rendering techniques and simulation.

ARCH 246 Foundations of Historic Preservation
Credits 3. 3 Lecture Hours.
Exploration and evaluation of the cross-disciplinary work of historic preservation; emphasis on the significance of historic places to societal well-being and conservation alternatives for historic and cultural environments; review of preservation projects and treatments; guest presentations and case studies from practicing professionals and researchers in a variety of fields.

ARCH 249 Survey of World Architecture History I
Credits 3. 3 Lecture Hours.

ARCH 250 Survey of World Architecture History II
Credits 3. 3 Lecture Hours.
(ARCH 1302) Survey of World Architecture History II. A survey of world architecture and the human-designed and built environment from the 13th to the 19th century.

ARCH 251 Seminar in Contemporary Architecture Lecture Series
Credit 1. 1 Lecture Hour.
Presentations by and discussions with professionals representing specialty areas related to environmental design through the Department of Architecture Lecture Series. May be taken four times for credit. Must be taken on a satisfactory/unsatisfactory basis.

ARCH 257 Research in Architecture Innovation
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in the College of Architecture. May be repeated 2 times for credit.
Prerequisite: Approval of instructor and department head.

ARCH 258 Architectural Design III
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Integration of architectural theories and philosophy with environmental design systems; study of theoretical approaches to graphic and analytical thinking, problem identification and design dissemination through various media, case studies and problem resolution; conditions and forces associated with a variety of building types and the generation design solutions.
Prerequisites: Admission to upper level in environmental design; ARCH 249 and ARCH 250.
ARCH 317 Digital Fabrication for Architecture
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Digital fabrication for architecture including software, numerically controlled tools, translation applications and management strategies for digital fabrication workflows; production of building components from three dimensional datasets of virtual architecture proposals.  
Prerequisites: Junior or senior classification or approval of instructor; ARCH 216 or approval of instructor.

ARCH 327 Conceptual Structural Analysis
Credits 3. 1 Lecture Hour. 4 Lab Hours.
A non-mathematical investigation of structural systems and components with respect to behavior; selection of the most appropriate structural system for various building typologies.  
Prerequisite: Junior or senior classification or approval of instructor.

ARCH 328 Architectural Envelopes
Credits 3. 3 Lecture Hours.
Study of roof, wall, glazing and screen systems of significant works in contemporary architecture and the strategies behind their making; focus on innovative materials, surface effects, and performance aspects.  
Prerequisite: Junior or senior classification in environmental design.

ARCH 330 The Making of Architecture
Credits 3. 3 Lecture Hours.
Study of significant works of contemporary architecture and materials and strategies used in their making; focus on innovative materials, systems, and partnerships necessary to realize the design.  
Prerequisites: Junior or senior classification in environmental design or approval of instructor or ARCH classification.

ARCH 331 Architectural Structures
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Physical principles that govern statics and strength of materials through the design of architectural structures from a holistic view, in the context of architectural ideas and examples; introduction to construction, behavior of materials, and design considerations for simple and complex structural assemblies; computer applications.  
Prerequisites: Junior or senior classification in environmental design; MATH 142 or equivalent; PHYS 201.

ARCH 333 Architectural Systems
Credits 3. 3 Lecture Hours.
Theory and applications of building energy use, envelope design, shading analysis, heating and cooling systems, lighting design; building water supply, plumbing and drainage systems; electrical, acoustical, fire and lightning protection; life safety, transportation systems and construction materials; calculations, equipment selection, and component sizing as they relate to building design.  
Prerequisites: Junior or senior classification in environmental design; PHYS 201.

ARCH 345 History of Building Technology
Credits 3. 3 Lecture Hours.
Chronological development of civilization and building technology from prehistoric cultures to present; classic and modern materials, structural devices past and present, machine-produced products, prefabrication, construction methodology and servicing.  
Prerequisite: Junior or senior classification in environmental design.

ARCH 346 Architecture, Heritage and Culture
Credits 3. 3 Lecture Hours.
Global exploration of how architecture and the built environment express culture and identity; theoretical and practical approaches to cultural heritage and conservation.  
Prerequisite: Junior or senior classification.

ARCH 347 Recording Historic Buildings
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Techniques for recording historic buildings; measuring and drawing to Historic American Building Survey Standards; field experience in photography, laser scanning, photogrammetry, hand measuring, field notes and record drawing preparation. May be repeated for credit.  
Prerequisites: Junior or senior classification or approval of instructor.

ARCH 350 History and Theory of Modern and Contemporary Architecture
Credits 3. 3 Lecture Hours.
Development of modern and contemporary architecture in the 20th and 21st centuries; materials, structure, social and economic changes as well as architectural theory.  
Prerequisites: Junior or senior classification.

ARCH 353 History of Product Design
Credits 3. 3 Lecture Hours.
History of product design in Europe and America including the relationship between designer and object, the relationship of design, industry and media over time and design criticism; focus on material/technical and typological approaches, comparative method and content analysis in context of original environment and social history.  
Prerequisite: Junior or senior classification or approval of instructor.

ARCH 360 Topics in Design Build Community Service
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Contemporary topics in architectural design-build practices including high impact interdisciplinary learning experiences developed through a project-based learning model with a focus on the planning, design, pre-construction, construction and project delivery; team-based approach with those outside of the architecture discipline to design, plan and complete project documents, estimates and undertake the construction activities necessary to make a fully functioning community service project.  
Prerequisites: Junior or senior classification or approval of instructor.

ARCH 381 Design Seminar
Credit 1. 1 Lecture Hour.
Presentations by and discussions with professionals representing specialty areas related to architectural fabrication and product design. May be taken three times for credit.  
Prerequisite: Junior or senior classification or approval of instructor.

ARCH 405 Architectural Design IV
Credits 5. 2 Lecture Hours. 9 Lab Hours.
A comprehensive design studio focused on the integration of design theory with functionally sustainable environmental and structural systems; consideration of a project from site analysis and programming through design detailing.  
Prerequisites: Admission to upper level in environmental design; ARCH 365, ARCH 331, ARCH 335; CARC 301 or ARCH 494; concurrent enrollment in ARCH 431 and ARCH 435.

ARCH 406 Architecture Design V
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Topical approaches to design, emphasizing theory and practice of architecture or related disciplines, such as urban design, interior design, health care design, etc.  
Prerequisites: Junior or senior classification; admission to upper level in environmental design; ARCH 305, ARCH 331 and ARCH 335; CARC 301 or ARCH 494; students may with approval of the department enroll in the course during the summer term prior to taking ARCH 405, ARCH 431 and ARCH 435 if they are within 20 credit hours of graduation prior to the beginning of the following fall semester.
ARCH 421 Energy and Sustainable Architecture
Credits 3. 3 Lecture Hours.
Understanding various design decisions impacting sustainability and energy efficiency; includes participation in an "academic" LEED-NC rating project; interdisciplinary team approach with a design studio architect to perform the LEED-NC rating on the architect's building; application of reference material, standards, and USGBC material.
Prerequisite: Junior and senior classification or approval of instructor.

ARCH 430 History of Ancient Architecture
Credits 3. 3 Lecture Hours.
Architecture of antiquity, examining stylistic, structural and theoretical advancements in building, beginning with Mesopotamian and continuing with Egyptian, Greek and Roman civilizations.
Prerequisite: ARCH 249 or ARTS 149; junior or senior classification or approval of degree coordinator or instructor.

ARCH 431 Integrated Structures
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Selection and economics of structural systems in the context of integrating structural systems into a building through good design; analysis and design of wood, steel, concrete, and composite systems and members in relation to building design.
Prerequisites: Admission to upper level in environmental design; ARCH 305, ARCH 331, ARCH 335; concurrent enrollment in ARCH 405 and ARCH 435.

ARCH 433 Architectural Lighting
Credits 3. 3 Lecture Hours.
Theory and practice of lighting design as an art and science; aperture design for sunlight control; selecting and locating luminaries to enhance interior and exterior surfaces and spaces.
Prerequisite: ARCH 335 or junior or senior classification in EDAS.

ARCH 434 The Role of Sculpture and Painting in Ancient Architecture
Credits 3. 3 Lecture Hours.
Interrelationships of architecture, painting and sculpture in the ancient world including Egypt, Mesopotamia, Crete, Greece and Rome.
Prerequisite: ARCH 249 or ARTS 149; junior or senior classification or approval of degree coordinator or instructor.

ARCH 435 Integrated Systems
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Understanding how to integrate sustainable environmental systems into a building through good design; lectures support studio; systems faculty participate in studio critiques throughout the project.
Prerequisites: Admission to upper level in environmental design; ARCH 305, ARCH 331, ARCH 335; concurrent enrollment in ARCH 405 and ARCH 431.

ARCH 437 Great Medieval Cathedrals
Credits 3. 3 Lecture Hours.
Interrelationships of architecture, sculpture and stained glass, technology and construction, function and form, society and patronage in the great period of medieval building.
Prerequisite: ARCH 250 or ARTS 150; junior or senior classification or approval of degree coordinator or instructor.

ARCH 438 History and Design of Sacred Architecture
Credits 3. 3 Lecture Hours.
Exploration of history and design of sacred architecture; review of historic and contemporary houses of worship; global historic trends in sacred architecture in light of the current development in liturgy and design; significance of sacred places to society and culture.
Prerequisite: Junior or senior classification or approval of instructor.
ARCH 463 Elements of Interior Architecture
Credits 3. 3 Lecture Hours.
Analysis and design of architectural interiors; historical and professional perspectives incorporating programming, space planning and organization; specification and selection of furnishings and materials to satisfy user needs in residential, commercial and institutional settings. 
Prerequisites: Admission to upper level in environmental design; concurrent enrollment in ARCH 405, ARCH 431 and ARCH 435 not allowed.

ARCH 481 Seminar
Credit 1. 1 Lecture Hour.
Presentations by and discussions with professionals representing specialty areas related to environmental design; career and academic objectives. May be repeated for up to 4 credit hours. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Junior or senior classification or approval of instructor.

ARCH 484 Summer Internship
Credits 6. 12 Other Hours.
Practical experience in an office of design allied professionals; 10-week internship with a minimum of 400 hours continuous employment; departmental pre-approval through the departmental internship coordinator required; post evaluation conducted following the internship. May not be repeated for credit.
Prerequisites: Junior or senior classification or approval of instructor; approval of the environmental design internship coordinator.

ARCH 485 Directed Studies
Credits 1 to 5. 1 to 5 Other Hours.
Special projects in architecture. May be repeated for credit.
Prerequisites: Admission to upper level in environmental design; approval of instructor and department head.

ARCH 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Special topics in an identified area of architecture. May be repeated for credit.
Prerequisite: Junior or senior classification; approval of instructor and degree coordinator.

ARCH 491 Advanced Architecture Innovation Research
Credits 1 to 6. 1 to 6 Other Hours.
Research conducted under the direction of faculty member in the College of Architecture. May be repeated 2 times for credit.
Prerequisite: Admission to upper level in environmental design; approval of instructor and department head.

ARCH 494 Internship
Credits 9. 18 Other Hours.
Practical experience in an office of design allied professionals; fifteen week internship with a minimum of 600 hours of continuous employment; departmental pre-approval through the departmental internship coordinator required; post evaluation conducted following the internship. To be taken only as a requirement for the study away semester. May not be repeated for credit.
Prerequisites: Junior or senior classification; admission to upper level in environmental design; CARC 481; approval of the environmental design internship coordinator.

ARCH 494 Internship
Credits 1 to 6. 1 to 6 Other Hours.
Research conducted under the direction of faculty member in the College of Architecture. May be repeated 2 times for credit.
Prerequisite: Admission to upper level in environmental design; approval of instructor and department head.

ARTS - Art (ARTS)

ARTS 103 Design I
Credits 3. 2 Lecture Hours. 4 Lab Hours.
(ARTS 1311) Design I. Two-dimensional design; fundamentals of line, color, form, texture, shape, space and arrangement.

ARTS 104 Introduction to Graphic Design
Credit 1. 2 Lab Hours.
Introduction to the concepts and techniques utilized in the layout of graphic presentations; basic digital camera operations, typography, use of color, design principles; integration of type, graphic elements and images.
Prerequisite: Major in visualization or minor in art.

ARTS 111 Drawing I
Credits 3. 2 Lecture Hours. 4 Lab Hours.
(ARTS 1316) Drawing I. Variety of media techniques and subjects, exploring perceptual and descriptive possibilities; drawing as a developmental process as well as an end in itself; freehand.

ARTS 115 Drawing for Visualization
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Investigation of and practice with tools, methods and techniques available for communication of designs; drawing, graphics, rendering and color.
Prerequisite: Visualization majors only.

ARTS 149 Art History Survey I
Credits 3. 3 Lecture Hours.
(ARTS 1303) Art History Survey I. Survey of architecture, painting, sculpture and the minor arts from prehistoric times to 14th century.

ARTS 150 Art History Survey II
Credits 3. 3 Lecture Hours.
(ARTS 1304) Art History Survey II. Survey of architecture, painting, sculpture and the minor arts from the 14th century to the end of the 19th century.

ARTS 210 Introduction to Photography
Credits 3. 2 Lecture Hours. 3 Lab Hours.
(ARTS 2356) Introduction to Photography. Introduction to the digital camera, creation, manipulation and critique of the digital image; composition and aesthetics; exposure control; digital work-flow; post-processing techniques; layering and compositing; history of the photographic image.
Prerequisite: Non-visualization majors only.

ARTS 212 Life Drawing
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Emphasis on structure and action of the human figure.
Prerequisite: ARTS 111 or ARTS 115 or equivalent, or approval of instructor and undergraduate program coordinator.

ARTS 303 Graphic Design I
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Introduction to the principles of graphic design; composition and their application for printed and digital media.
Prerequisites: ARTS 104, VIST 105, ENDS 105 or approval of instructor and undergraduate program coordinator.

ARTS 304 Graphic Design II
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Continuation of ARTS 303; concepts in advanced graphics as a tool for design solutions for publication and promotion; emphasis on creative thinking over technology.
Prerequisites: ARTS 303; junior or senior classification.
ARTS 305 Painting I
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Exploring potentials of painting media with emphasis on color and composition.
Prerequisite: ARTS 111 or ARTS 115 or approval of instructor and undergraduate program coordinator; junior or senior classification.

ARTS 308 Sculpture
Credits 3. 1 Lecture Hour. 5 Lab Hours.
Sculptural principles of physical form, space and materials; context and content of three-dimensional art forms.
Prerequisite: ARTS 115 or equivalent or approval of instructor and undergraduate program coordinator; junior or senior classification.

ARTS 311 Black and White Photography
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Exploration of vision through the photographic image as a medium of visual expression; basic theory and practice of black and white and/or still photography and/or digital imaging; historic development and aesthetic concern for photographic imagery.
Prerequisites: Approval of instructor and undergraduate program coordinator; junior or senior classification.

ARTS 312 Advanced Photography
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Advanced photographic image-making; development, control and presentation of the expressive photographic image; expression and criticism.
Prerequisite: ARTS 210, VIST 310 or ARTS 311.

ARTS 325 Digital Painting
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Theory and practice of digital painting media; exploration of traditional and new forms of art making and creativity; emphasis on color theory.
Prerequisites: ARTS 103, ARTS 115 or equivalent; junior or senior classification. Field trip required.

ARTS 329 Texas Art History
Credits 3. 3 Lecture Hours.
The development of visual arts in Texas; an examination of art movements, artists and major works exhibiting a broad range of artistic techniques.
Prerequisite: Junior or senior classification or approval of instructor and undergraduate program coordinator.

ARTS 330 The Arts of America
Credits 3. 3 Lecture Hours.
Survey of painting, sculpture, crafts and architecture of prehistoric America to the present; emphasis on art as a record of cultural, economic and social evolution.
Prerequisite: Junior or senior classification or approval of instructor and undergraduate program coordinator.

ARTS 335 The Art and Architecture of Rome
Credits 3. 3 Lecture Hours.
Rome as a microcosm of western civilization; a survey of western architectural and art history from antiquity through the Baroque; a focus on the Eternal City’s buildings, paintings, mosaics and sculptures exploring criteria, methods, goals and results of major architectural and artistic movements and the people involved.
Prerequisite: Junior or senior classification or approval of instructor and undergraduate program coordinator.

ARTS 339 The History of Modern Art
Credits 3. 3 Lecture Hours.
Chronological development of late 19th through 20th century art; emphasis on key artists, paintings, sculpture, photography and architecture.
Prerequisite: Junior or senior classification or approval of instructor and undergraduate program coordinator.

ARTS 350 The Arts and Civilization
Credits 3. 3 Lecture Hours.
Investigation of the image of work of selected periods in terms of criticism, aesthetic rationale, specific masters and social significance by going beyond historical chronology.

ARTS 353 Color Theory
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Aspects of color and color theory including optical phenomena, color theory and perception; application and principles with respect to art and design; two-dimensional and three-dimensional projects examining color theories.
Prerequisites: College of Architecture majors or art minors; junior or senior classification.

ARTS 403 Graphic Design III
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Advanced graphic design concepts and practices; development of unified graphic campaigns to promote a product, an organization, a publication, a service, or business; advanced problem-solving techniques based on the design process through research, analysis, and presentation; systematic approach to visual development.
Prerequisites: ARTS 303 and ARTS 304; junior or senior classification or approval of instructor and undergraduate program coordinator; knowledge of industry-standard software (Adobe Photoshop, InDesign and Illustrator) is expected.

ARTS 445 Byzantine Art and Architecture
Credits 3. 3 Lecture Hours.
A critical and historical investigation of Mediterranean art and architecture from the third century to the middle of the fifteenth century; emphasis on the artistic achievements from the late antique Mediterranean and the Byzantine Empire; investigation of architectural decoration, public monuments, cultural diversity and controversies over images.
Prerequisite: Junior or senior classification.

ARTS 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems in the fine and applied visual and plastic arts. May be repeated for up to 12 credit hours.
Prerequisite: Approval of instructor and undergraduate program coordinator.

ARTS 489 Special Topics in... Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified field of the fine or applied visual and plastic arts. May be repeated for up to 9 credit hours.
Prerequisite: Approval of instructor and undergraduate program coordinator.
ASIA - Asian Studies (ASIA)

ASIA 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Selected fields of Asian Studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit.
Prerequisite: Approval of director of Asian Studies.

ASIA 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in Asian studies. May be repeated for credit.

ASIA 306/SOCI 306 Society and Population of Modern China
Credits 3. 3 Lecture Hours.
Major trends and current topics in social and demographic aspects of the society of modern China, including Taiwan.
Prerequisite: Junior or senior classification.
Cross Listing: SOCI 306/ASIA 306.

ASIA 325/SOCI 325 International Business Behavior
Credits 3. 3 Lecture Hours.
Theoretical models and practical protocols/behavior demands to conduct business and to work in France, Germany, Japan, China, Mexico and other countries; discussion of national character, managerial and negotiating styles.
Prerequisite: Junior or senior classification.
Cross Listing: SOCI 325/ASIA 325.

ASIA 329/SOCI 329 Pacific Rim Business Behavior
Credits 3. 3 Lecture Hours.
Theoretical models of Asian cultures and practical protocol/etiquette related to business and work in China, Thailand, South Korea, Japan, Australia, and other Pacific Rim nations; discussions of national character, managerial behavior and values.
Prerequisite: Junior or senior classification.
Cross Listing: SOCI 329/ASIA 329.

ASIA 330 Modern Mediterranean World
Credits 3. 3 Lecture Hours.
Critical examination of Mediterranean history; colonialism, industrialization, and other trans-national phenomena linking Africa, Asia, and Europe; social and political movements, migration, intellectual trends.
Prerequisite: Junior or senior classification.

ASIA 335/ANTH 335 Cultures of Central Asia
Credits 3. 3 Lecture Hours.
Study of anthropological research in Central Asia: ecological adaptations; colonialism and post-colonialism; ethnic politics and ethnic conflict; religion and identity; gender and family; globalization and modernization.
Prerequisite: Junior or senior classification.
Cross Listing: ANTH 335/ASIA 335.

ASIA 349/HIST 349 The Vietnam War/The American War
Credits 3. 3 Lecture Hours.
Vietnam's relations with the West; French colonialism; origins and development of Vietnamese nationalism; Cold War and American involvement; wartime societies in North and South Vietnam; expansion of the war to Cambodia and Laos; anti-war movements in the United States; reasons for the American defeat; consequences and lessons of the war.
Prerequisites: Junior or senior classification.
Cross Listing: HIST 349/ASIA 349.

ASIA 350/HIST 350 World War II in Asia and the Pacific
Credits 3. 3 Lecture Hours.
Origins and development of Japanese imperialism; Japan's expansion into East and Southeast Asia and the Pacific; wartime societies; collaboration and resistance; effects of the war in the United States on Japanese-Americans; outcomes of the war; remembrance of the war.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 350/ASIA 350.

ASIA 351/HIST 351 Traditional East Asia
Credits 3. 3 Lecture Hours.
History and culture of China and Japan from earliest times to the coming of the West; impact of Confucianism and Buddhism; development of social, political and economic systems.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 351/ASIA 351.

ASIA 352/HIST 352 Modern East Asia
Credits 3. 3 Lecture Hours.
Impact of the West on traditional China and Japan; the response through modernization; rise of nationalism and formation of modern nation states.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 352/ASIA 352.

ASIA 354/HIST 354 Imperial China
Credits 3. 3 Lecture Hours.
History of imperial China from the earliest dynasties through the mid19th century, including major political events, the structure of Chinese government, economic development, philosophies and religion, wars and military and culture and daily life.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 354/ASIA 354.

ASIA 355/HIST 355 Modern China
Credits 3. 3 Lecture Hours.
History of China from the coming of the West to the present; social, economic and political changes which have taken place during that period.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 355/ASIA 355.

ASIA 356/HIST 356 Twentieth Century Japan
Credits 3. 3 Lecture Hours.
Industrialization and modernization of Japan; its rise from an isolated nation to a major world power and economic giant.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 356/ASIA 356.

ASIA 358/HIST 358 Chinese Cultural History
Credits 3. 3 Lecture Hours.
Examination of Chinese culture and its evolution over the last 4,000 years; customs, art, literature, festivals, folklore, religion, architecture, medicine, and everyday life.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 358/ASIA 358.

ASIA 360/ANTH 360 Archaeology of the Old World
Credits 3. 3 Lecture Hours.
Overview of archaeology and prehistory of Europe, Africa and Asia from the evolution of the hominids to the development of agriculture and the rise of civilization.
Prerequisite: Junior or senior classification.
Cross Listing: ANTH 350/ASIA 360.
ASIA 365/POLS 365 Asian Governments and Politics
Credits 3. 3 Lecture Hours.
Contemporary political systems of Asia, political institutions, actors and processes.
Prerequisite: Junior or senior classification.
Cross Listing: POLS 365/ASIA 365.

ASIA 401 Slavery in World History
Credits 3. 3 Lecture Hours.
Comparative history of human slavery; slavery in the Ancient World, Asia, Africa; varieties of modern slavery in the New World since 1500; abolition of slavery and continuing forms of human bondage in the contemporary world.
Prerequisite: Junior or senior classification.
Cross Listing: AFST 401 and HIST 401.

ASIA 463 Gender in Asia
Credits 3. 3 Lecture Hours.
Gender dynamics in Asia; changes in gender roles; women's movements; women and the economy; women and politics; men's and women's private lives.
Prerequisite: Junior or senior classification.
Cross Listing: SOCI 463 and WGST 463.

ASIA 485 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Selected fields of Asian Studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit.
Prerequisite: Approval of director of Asian Studies.

ASIA 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in Asian Studies. May be repeated for credit.

ASIA 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of a faculty member in Asian Studies. May be repeated 3 times for credit.
Prerequisites: 6 credits of ASIA; junior or senior classification; approval of instructor.

ASIA - Asian Studies

ASTR 101 Basic Astronomy
Credits 3. 3 Lecture Hours.
(ASTR 1303) Basic Astronomy. A qualitative approach to basic stellar astronomy; earth-moon-sun relationships then studies of distances to stars, stellar temperatures, and other physical properties; birth, life on the main sequence of the H-R diagram, and ultimate fates of stars; not open to students who have taken ASTR 111 or ASTR 314.

ASTR 102 Observational Astronomy
Credit 1. 3 Lab Hours.
Observational and laboratory course which may be taken in conjunction with ASTR 101 or ASTR 314. Use of techniques and instruments of classical and modern astronomy.
Prerequisite: ASTR 101 or ASTR 314, or registration therein.

ASTR 103 Introduction to Stars and Exoplanets
Credits 3. 3 Lecture Hours.
A qualitative study of stellar birth, stellar structure and evolution, stellar nucleosynthesis, the Hertzsprung-Russell Diagram, white dwarfs, neutron stars, supernovae, black holes, proto-planetary systems, origin of the solar system and the search for exoplanets; utilizes active learning methods that incorporate observations from the current generation of ground and space-based telescopes. Open to all majors.

ASTR 104 Introduction to Galaxies and Cosmology
Credits 3. 3 Lecture Hours.
A qualitative study of properties of galaxies, galaxy evolution through cosmic time, galactic archaeology, active galactic nuclei, super-massive black holes, large-scale structure, the expansion history of the universe, cosmological parameters and Big Bang nucleosynthesis; utilizes active learning methods that incorporate observations from the current generation of ground and space-based telescopes. Open to all majors.

ASTR 109/PHYS 109 Big Bang and Black Holes
Credits 3. 3 Lecture Hours.
Designed to give an intuitive understanding of the Big Bang and Black Holes, without mathematics, and de-mystify them for the non-scientist.

ASTR 111 Overview of Modern Astronomy
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(ATER 1303 and ASTR 1103, ASTR 1403, PHYS 1303 and PHYS 1103, PHYS 1403) Overview of Modern Astronomy. Roots of modern astronomy; the scientific method; fundamental physical laws; the formation of planets, stars, and galaxies; introduction to cosmology; includes an integrated laboratory that reinforces the lecture topics, including hands-on experience with telescopes and imaging of celestial objects; not open to students who have taken ASTR 101 or ASTR 314.

ASTR 119/PHYS 119 Big Bang and Black Holes: Laboratory Methods
Credit 1. 2 Lab Hours.
Hands-on understanding of the concepts surrounding the Big Bang and Black Holes; emphasis on the evidence-based decision making process, methods and presentation; for non-scientists. Companion course for ASTR 109/PHYS 109/ASTR 109.
Prerequisite: ASTR/PHYS 109/ASTR 109 or registration therein.
Cross Listing: PHYS 119/ASTR 119.

ASTR 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum; intended for use as lower-level credit.
Prerequisite: Approval of department head.

ASTR 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of astronomy. May be repeated for credit.
Prerequisite: Approval of instructor.

ASTR 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of a faculty member in astronomy. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ASTR 314 Survey of Astronomy
Credits 3. 3 Lecture Hours.
Primarily for majors in science and engineering. Kepler’s laws, law of gravitation, solar system, stars, stellar evolution, nucleosynthesis, cosmology, clusters, nebulae, pulsars, quasars, black holes.
Prerequisite: PHYS 208.
ASTR 320 Astrophysical Research Methods  
Credits 2. 2 Lecture Hours.  
Background and tools used by astronomical researchers in performing analyses; topics include reduction of photometric and spectroscopic data, bivariate and multivariate statistical methods and chi-squared minimization.  
Prerequisites: MATH 171 and MATH 172.

ASTR 401 Stars and Extrasolar Planets  
Credits 3. 3 Lecture Hours.  
How stars are born, how internal structure changes, nuclear fuel burned and ultimate fate; extrasolar planet detection, formation, properties and habitability.  
Prerequisite: ASTR 314.

ASTR 403 Extragalactic Astronomy and Cosmology  
Credits 3. 3 Lecture Hours.  
Physical makeup of individual galaxies and large scale structure in the universe; origin and eventual fate of the universe; interpretation of observational data as it relates to baryonic matter, Dark Matter and cosmological models with Dark Energy.  
Prerequisite: ASTR 314.

ASTR 485 Directed Studies  
Credits 1 to 12. 1 to 12 Other Hours.  
Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum.  
Prerequisite: Approval of department head.

ASTR 489 Special Topics in...  
Credits 1 to 4. 0 to 4 Lab Hours.  
Selected topics in an identified topic of astronomy. May be repeated for credit.  
Prerequisite: Approval of instructor.

ASTR 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in astronomy. May be repeated for credit.  
Prerequisite: Approval of instructor.

ATMO - Atmospheric Sciences (ATMO)

ATMO 201 Weather and Climate  
Credits 3. 3 Lecture Hours.  
Structure, energy, and motions of the atmosphere; climate; fronts and cyclones; atmospheric stability; clouds and precipitation; severe storms.

ATMO 202 Weather and Climate Laboratory  
Credit 1. 2 Lab Hours.  
Practical laboratory experiments and exercises, conducted in the meteorology and computer laboratories, concerning the fundamental physical processes underlying atmospheric phenomena, and the collection, display and interpretation of meteorological information. For non-majors only.

ATMO 203 Weather Forecasting Laboratory  
Credit 1. 2 Lab Hours.  
Short-range weather forecasting practice; numerical guidance; weather map analysis and discussions.  
Prerequisite: Concurrent enrollment in ATMO 201.

ATMO 251 Weather Observation and Analysis  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Standard and experimental weather observing techniques; subjective and objective analysis; application of conceptual models; simple kinematic and dynamic constraints.  
Prerequisite: ATMO 203 or registration therein.

ATMO 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations not covered by any other courses in established curriculum.  
Prerequisite: Freshman or sophomore classification.

ATMO 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of meteorology. May be repeated for credit.  
Prerequisite: Approval of instructor.

ATMO 291 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in atmospheric sciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

ATMO 321 Computer Applications in the Atmospheric Sciences  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Introduction to technical computing methods in the atmospheric sciences; use of specialized software and data analysis systems for meteorological applications.

ATMO 324 Physical and Regional Climatology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Climate causes; global and surface energy balance; hydrologic cycle; general circulation; climate change; climate data analysis.  
Prerequisites: ATMO 201 and ATMO 203; MATH 308 or registration therein or approval of instructor; ATMO 321 or equivalent; junior or senior classification.

ATMO 326 Environmental Atmospheric Science  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Basic concepts of meteorology as needed in environmental sciences; patterns of meteorological and climatic elements and their relevance in terrestrial ecology and urban sciences; solar and wind energy physics; practical experience in use of instruments to measure micro-climates as they relate to meteorological conditions and analysis of data.  
Prerequisites: ATMO 201 or GEOG 203, or approval of instructor.

ATMO 335 Atmospheric Thermodynamics  
Credits 3. 3 Lecture Hours.  
Application of thermodynamics to Earth’s atmosphere; phase changes of water; stability concepts; introduction to physical chemistry.  
Prerequisites: CHEM 102; MATH 251; PHYS 218.

ATMO 336 Atmospheric Dynamics  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Kinematic concepts and relationships; equations of motion; geostrophic and accelerated motions; the vorticity equation and Rossby waves.  
Prerequisites: ATMO 335 or registration therein; MATH 308 or registration therein; junior or senior classification.
ATMO 352 Severe Weather and Mesoscale Forecasting
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Parcel theory for dry and moist convection; sounding diagrams and their application to atmospheric convection; organization of midlatitude convection and severe weather; thunderstorm forecasting.
Prerequisite: MATH 152 or MATH 172.

ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution
Credits 3. 3 Lecture Hours.
Descriptive introduction of the composition and chemistry of natural and pollutant compounds in the atmosphere; transport, cycling and reactivity of atmospheric material; atmospheric measurements, data processing, air quality and human health issues; air pollution trends and climate change.
Prerequisites: CHEM 101 and CHEM 102 or approval of instructor.

ATMO 435 Synoptic-Dynamic Meteorology
Credits 3. 3 Lecture Hours.
Dynamics and diagnosis of synoptic-scale systems; perturbation theory and baroclinic instability; wave energetics, frontogenesises.
Prerequisites: ATMO 336 or equivalent; MATH 308.

ATMO 441 Satellite Meteorology and Remote Sensing
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduction to satellite orbit dynamics, atmospheric radiative transfer, atmospheric remote sensing methods, and analysis and application of remotely sensed meteorological data.
Prerequisites: ATMO 324, MATH 308; junior or senior classification.

ATMO 443 Radar Meteorology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Principles of radar theory, hardware, operations and analysis using real-time radar and computer-based case studies; conventional, Doppler and polarimetric weather radar; precipitation estimation, hydrometeor identification and air motion analysis; observations and analyses of thunderstorms, mesocyclones, tornadoes and gust fronts.
Prerequisites: ATMO 352; PHYS 208.

ATMO 446 Physical Meteorology
Credits 3. 3 Lecture Hours.
Physics and meteorology of clouds and precipitation; atmospheric electricity; radiative transfer.
Prerequisite: ATMO 335.

ATMO 455 Numerical Weather Prediction
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Basic principles of computer models of the atmosphere; parameterizations; use and critical evaluation of models and model output.
Prerequisites: MATH 308; ATMO 336 or registration therein.

ATMO 456 Practical Weather Forecasting
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Advanced weather forecasting techniques with application to a variety of forecasting problems, both public and private sector.
Prerequisites: ATMO 435 or registration therein; junior or senior classification.

ATMO 459 Tropical Meteorology
Credits 3. 3 Lecture Hours.
Tropical climatology; structure, evolution, and motion of tropical cyclones; tropical cyclone hazards; large-scale tropical phenomena.
Prerequisites: ATMO 336; ATMO 352 or registration therein.

ATMO 461 Broadcast Meteorology
Credit 1. 2 Lab Hours.
Instruction in the practice of broadcast meteorology; practice in and preparation of weather forecast products and demonstration videotapes. May be taken two times for credit with faculty advisor approval.
Prerequisites: ATMO 335 or registration therein; MATH 308 or registration therein; junior or senior classification.

ATMO 463 Air Quality
Credits 3. 3 Lecture Hours.
Atmospheric pollution sources, transport, sinks, and effects; monitoring of air pollutant emissions and of ambient concentrations; use of models to simulate air pollution; regulation of emissions and ambient concentrations; greenhouse gas emissions regulations.
Prerequisite: CHEM 101 or CHEM 107 or approval of instructor; junior or senior classification.

ATMO 464 Laboratory Methods in Atmospheric Sciences
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Instruction in chemical techniques used to monitor the atmosphere and other earth systems; sampling strategies; survey of current literature focusing on development of new techniques.
Prerequisites: CHEM 101 and one semester of calculus (MATH 171 or equivalent).

ATMO 484 Internship
Credits 0 to 3. 0 to 3 Other Hours.
Supervised internship at National Weather Service or in broadcast meteorology or elsewhere with faculty advisor approval; must complete a report and have a letter from supervisor for credit. May be taken three times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: ATMO 251; approval of faculty advisor.

ATMO 485 Directed Studies
Credits 1 to 23. 1 to 23 Other Hours.
Offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations not covered by any other courses in established curriculum.
Prerequisite: Junior or senior classification.

ATMO 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of meteorology. May be repeated for credit.

ATMO 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in atmospheric sciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

ATTRA - Athletic Training (ATTR)

ATTR 201 Field Experience in Athletic Training I
Credit 1. 4 Lab Hours.
Field based experience in athletic training to provide on-the-job training designed to enhance and clarify career objectives; knowledge and skill development in professional behaviors, injury prevention and risk management.
Prerequisite: Kinesiology majors.
 ATTR 202 Field Experience in Athletic Training II  
Credit 1. 4 Lab Hours.  
Field based experience in athletic training to provide on-the-job training designed to enhance and clarify career objectives; knowledge and skill development in recognition and evaluation of common injuries and illnesses and their management.  
Prerequisite: ATTR 201.

ATTR 301 Field Experience in Athletic Training I  
Credit 1. 4 Lab Hours.  
Field based experience in athletic training to provide on-the-job training designed to enhance and clarify career objectives; knowledge and skill development in the treatment and rehabilitation of athletic injuries.  
Prerequisite: ATTR 202.

ATTR 302 Field Experience in Athletic Training II  
Credit 1. 4 Lab Hours.  
Field based experience in athletic training to provide on-the-job training designed to enhance and clarify career objectives; knowledge and skill development in athletic training administration; exploration of policy and position statements; professional development.  
Prerequisite: ATTR 301.

BAEN - Biological & Ag Engr (BAEN)

BAEN 150 Introduction to Biological and Agricultural Engineering Design  
Credit 1. 2 Lab Hours.  
Introduction to the engineering design process using design problems presented by biological and agricultural engineers from industry; problem definition, information search, idea generation and development of design concepts.  
Prerequisite: Engineering major or approval of department head.

BAEN 201 Analysis of Biological and Agricultural Engineering Problems  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Overview of Biological and Agricultural Engineering discipline through case studies and contemporary problems; introduction to computer programming; engineering analysis and problem solving using computer programming.  
Prerequisites: ENGR 111; MATH 151; CHEM 107 and CHEM 117 or BIOL 113 or PHYS 218.

BAEN 281 Professional Development Seminar  
Credit 1. 1 Lecture Hour.  
Familiarization with engineering design process used in professional environments where BAEN and AGSM graduates are employed; discussion of professional development topics; improvement of technical communication skills. May be taken 4 times for credit.

BAEN 284 Internship  
Credits 0. 0 Lecture Hours. 0 Lab Hours. 0 Other Hours.  
No Credit. Practical experience working in a professional biological and agricultural engineering setting. May be taken three times.  
Prerequisite: Freshman or sophomore classification; approval of the instructor.

BAEN 285 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Selected problems in any phase of agricultural engineering; credit and specific content dependent upon background, interest, ability and needs of student enrolled; individual consultations and reports required.  
Prerequisites: Freshman or sophomore classification; approval of department head.

BAEN 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of agricultural engineering. May be repeated for credit.  
Prerequisite: Approval of instructor.

BAEN 291 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of faculty member in biological and agricultural engineering.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

BAEN 301 Biological and Agricultural Engineering Fundamentals I  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Fundamental engineering concepts related to agricultural systems including the environment (soil, water, and air), plant and animal production systems and processing, and associated machines and facilities; application of techniques for data collection and analysis to problems in biological and agricultural engineering; design of experiments and communication of experimental results.  
Prerequisite: MEEN 221 or registration therein.

BAEN 302 Biological and Agricultural Engineering Fundamentals II  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Fundamentals of microbiology and biochemistry as they apply to biological and agricultural engineering systems to produce useful products and/or benign wastes; topics include microbiology, chemistry of biomolecules, microbial metabolism, bioenergetics, kinetics, mass transfer, bioreactor design, bioprocesses, and downstream processing.  
Prerequisites: BIOL 113; CHEM 222 or registration therein.

BAEN 320 Engineering Thermodynamics  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
First and second laws of thermodynamics; properties of pure substances; analysis of closed and open systems; applications to steady-flow and non-flow processes; power and refrigeration cycles; psychrometrics.  
Prerequisites: MEEN 221; MATH 251 or registration therein; junior or senior classification.

BAEN 340 Fluid Mechanics  
Credits 3. 3 Lecture Hours.  
Fundamentals of fluid properties; basic conservation principles of momentum, energy and continuity; flow through closed conduits; open channel flow; principles of turbomachines and compressible flow.  
Prerequisites: MEEN 221; BAEN 320; junior classification.

BAEN 354 Engineering Properties of Biological Materials  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Relationships between composition, structure and properties of biological materials; definition and measurement of mechanical, physical, thermal and other material properties; variability of properties; application of properties to engineering analysis and design of biological and agricultural processes and systems.  
Prerequisite: MEEN 222/MSEN 222.

BAEN 365 Unit Operations for Biological and Agricultural Engineering  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Theoretical and practical understanding of basic unit operations required to design processes and equipment in the agricultural, biological, environmental, and food industries, with unique constraints presented by biological and agricultural systems considered in design of all units.  
Prerequisites: BAEN 340; CVEN 305 or registration therein; junior or senior classification.
BAEN 366 Transport Processes in Biological Systems  
Credits 3. 3 Lecture Hours.
Basic principles governing transport of energy and mass; application of these principles to analysis and design of processes involving biological, environmental and agricultural systems.  
Prerequisites: BAEN 340; BAEN 354; BAEN 365 or registration therein; MATH 308; junior or senior classification.

BAEN 370 Measurement and Control of Biological Systems and Agricultural Processes  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Theory and application of sensors and techniques in the design of systems for automatic control in biological systems and agricultural production and processing; sensor operation; signal processing; control techniques; automation and robotics.  
Prerequisite: ECEN 215.

BAEN 375 Design Fundamentals for Agricultural Machines and Structures  
Credits 3. 3 Lecture Hours.
Applications of stress/strain relationships and failure theory to the design of agricultural machines and structures; structural properties of engineering materials; finite element analysis and computer aided engineering design.  
Prerequisite: CVEN 305.

BAEN 399 Professional Development  
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes from the National Society of Professional Engineers' Engineering Body of Knowledge; documentation and self-assessment of learning experience.  
Prerequisites: Junior or senior classification; or approval of instructor.

BAEN 412 Hydraulic Power  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Hydraulic power systems; energy and power relationships; hydraulic fluid properties; frictional losses in pipelines; hydraulic pumps, cylinders, valves and motors; servo and proportional valves; circuit design and analysis; conductors, fittings and ancillary devices; maintenance of hydraulic systems; pneumatic components and circuits; electrical controls and fluid logic; electro-hydraulic systems.  
Prerequisites: BAEN 340 and 375.

BAEN 414 Renewable Energy Conversions  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Energy/power systems through engineering and technical aspects of quantifying and designing the suitability of several types of renewable energy resources; new insights of vast resources that future engineers can harness to augment diminishing supplies of nonrenewable energy.  
Prerequisite: BAEN 320, BAEN 366 or equivalent, or approval of instructor.

BAEN 417 Fundamentals of Nanoscale Biological Engineering  
Credits 3. 3 Lecture Hours.
Nanostructures, nanofabrication methods, instrumentation and applications pertinent to Biological, Food and Bioenergy systems; identification and utilization of key tools available for fabricating, manipulating and analysis of nanostructures used in biological engineering applications.  
Prerequisite: Senior classification in engineering or approval of instructor.

BAEN 422/CHEN 422 Unit Operations in Food Processing  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Design of food process engineering systems; basic concepts of rheology and physical properties of foods; fundamentals of heat and mass transfer and process control.  
Prerequisites: CHEN 205 and 304, or CVEN 305.  
Cross Listing: CHEN 422/BAEN 422.

BAEN 427 Engineering Aspects of Packaging  
Credits 3. 3 Lecture Hours.
Introduction to properties and engineering aspects of materials for use as components of a package and/or packaging system; principles of design and development of packages; evaluation of product-package-environment interaction mechanisms; testing methods; environmental concerns; regulations.  
Prerequisite: Senior classification or approval of instructor.

BAEN 431/CHEN 431 Fundamentals in Bioseparations  
Credits 3. 3 Lecture Hours.
Design principles and application of chemical engineering unit operations to the production of therapeutic and bioactive molecules.  
Prerequisite: BAEN 302 or BMEN 282/CHEN 282 or CHEN 282 or CHEN 382.  
Cross Listing: CHEN 431/BAEN 431.

BAEN 460 Principles of Environmental Hydrology  
Credits 3. 3 Lecture Hours.
Hydrologic cycle; precipitation, evaporation, evapotranspiration, infiltration, percolation, runoff, streamflow; groundwater and surface water flow; transport of contaminants in surface water; measurement and analysis of hydrologic data for engineering design.  
Prerequisites: BAEN 340; senior classification.

BAEN 464 Irrigation and Drainage Engineering  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Engineering principles and design of both surface and pressurized irrigation systems; introduction to the design of surface and subsurface drainage systems including crop water requirements, soil moisture, irrigation scheduling, surface irrigation, sprinkler irrigation, trickle irrigation, pumps, pipelines, irrigation canals, irrigation wells, and surface and subsurface drainage.  
Prerequisite: BAEN 340.

BAEN 465 Design of Biological Waste Treatment Systems  
Credits 3. 3 Lecture Hours.
Management and treatment of high organic content wastes, with emphasis on agricultural and food processing wastes; engineering design of biological waste treatment processes; regulatory aspects affecting management of agricultural wastes.  
Prerequisites: BIOL 113 and CHEM 222, or BAEN 302 and BAEN 340; or approval of instructor.

BAEN 468 Soil and Water Conservation Engineering  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Engineering principles of soil and water conservation; open channel flow principles, hydraulic grade stabilization, erosion control, storm water management, design of structures for floodwater routing, culvert design, design of waterways and agricultural reservoirs, stream bank protection, water quality assessment, groundwater flow, surface water modeling.  
Prerequisites: BAEN 340; CVEN 305.
BAEN 469 Water Quality Engineering  
Credits 3. 3 Lecture Hours.  
Nonpoint source pollution processes including transport mechanisms and contaminant fate; design of best management practices for abating nonpoint source pollution.  
Prerequisites: BAEN 340 or equivalent; CVEN 305.  

BAEN 471/CHEN 471 Bioreactor Engineering  
Credits 3. 3 Lecture Hours.  
Fundamentals of microbial and enzyme kinetics; basic biochemical reaction theory and reactor systems; heterogeneous reactions and transport considerations in enzyme and cell reactors, and immobilized systems; bioreactor design considerations in bioprocessing.  
Prerequisite: CHEN 282 or CHEN 382 or BAEN 302; junior or senior classification in engineering or approval of instructor.  
Cross Listing: CHEN 471/BAEN 471.  

BAEN 477 Air Pollution Engineering  
Credits 3. 3 Lecture Hours.  
Design of air pollution abatement equipment and systems to include cyclones, bag filters and scrubbers; air pollution regulations; permitting; dispersion modeling; National Ambient Air Quality Standards.  
Prerequisite: CVEN 305 or equivalent.  
Cross Listing: MEEN 477 and SENG 477.  

BAEN 479 Biological and Agricultural Engineering Design I  
Credits 3. 3 Lecture Hours.  
Capstone design project selection from problems posed by biological and agricultural engineers in industrial practice; completion of project feasibility study and outline; design philosophy, teamwork and communication; economics; product liability and reliability; use of standards and codes; goal setting, professional development, and time management; project to be completed in BAEN 480.  
Prerequisites: BAEN 340 and BAEN 365; BAEN 366 or BAEN 370.  

BAEN 480 Biological and Agricultural Engineering Design II  
Credits 3. 6 Lab Hours.  
Continuation of engineering design experience through team solution of design problem developed in BAEN 479; preparation of design solution under supervision of biological and agricultural engineering staff and clients; critical evaluation of results by students; staff and industrial consultants.  
Prerequisites: BAEN 479; senior classification.  

BAEN 481 Seminar  
Credit 1. 1 Other Hour.  
Review of current literature dealing with agricultural engineering problems presented by staff members and students.  
Prerequisite: Senior classification.  

BAEN 484 Internship  
Credits 0. 0 Lecture Hours. 0 Lab Hours. 0 Other Hours.  
No Credit. Practical experience working in a professional biological and agricultural engineering setting. May be taken three times.  
Prerequisite: Junior or senior classification; approval of the instructor.  

BAEN 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Selected problems in any phase of agricultural engineering. Credit and specific content dependent upon background, interest, ability and needs of student enrolled. Individual consultations and reports required.  
Prerequisites: Junior or senior classification and approval of department head.  

BAEN 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Special topics in an identified area of agricultural engineering. May be repeated for credit.  
Prerequisite: Approval of department head.  

BAEN 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of faculty member in biological and agricultural engineering. May be repeated 2 times for credit.  
Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.  

**BEFB-Bilingual Ed Field Based (BEFB)**  

**BEFB 425 Student Teaching in Hispanic Bilingual Education**  
Credits 3. 3 Lecture Hours.  
Observation and participation in Hispanic bilingual education classroom activity; supervised student teaching in accredited school. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisites: 2.5 GPA in teaching fields and professional development; approval of department head; senior classification. Must be taken concurrently with BEFB 426.  

**BEFB 426 Effective Instruction of Hispanic Students of Diverse Abilities**  
Credits 3. 3 Lecture Hours.  
Field-based application of effective instructional strategies for teaching Hispanic bilingual students of diverse abilities. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisites: 2.5 GPA in teaching fields and professional development; approval of department head. Must be taken concurrently with BEFB 425.  

**BEFB 470 Bilingual Assessment and Monitoring**  
Credits 3. 3 Lecture Hours.  
Assessment of language ability for second language learners; assessment instruments in bilingual/ESL programs; scoring and evaluation of second language assessment instruments.  
Prerequisites: Junior or senior classification; BEFB 472 and BEFB 474. Must be taken concurrently with BEFB 476.  

**BEFB 472 Bilingual and Dual Language Methodologies**  
Credits 3. 3 Lecture Hours.  
Use of theory and effective teaching practice in promoting student’s development of strong social and academic skills; relationship of culture to language.  
Prerequisite: Junior or senior classification. Must be taken concurrently with BEFB 474.  

**BEFB 474 Biliteracy for Bilingual and Dual Language Classrooms**  
Credits 3. 3 Lecture Hours.  
Social and linguistic characteristics of second language learners influencing literacy skills; reading and literature instruction for second language learners; reading and writing process across the curriculum for second language learners.  
Prerequisite: Junior or senior classification. Must be taken concurrently with BEFB 472.
BESC 476 Content Area Instruction for Bilingual Programs  
Credits 3. 3 Lecture Hours.
Use of theory and various approaches for integrating English as a second language; learning strategies relating to how plans, procedures and units engage language teachers, students and learning environments.  
Prerequisite: Junior or senior classification. Must be taken concurrently with BEFB 470.

BEFB 482 Seminar in Teachers as Effective Communicators  
Credit 1. 1 Lecture Hour.
Effective communication techniques for working with learners, colleagues, administrators and stakeholders; professional and social linguistic protocols for bilingual education teachers.  
Prerequisites: Junior or senior classification; concurrent enrollment in BEFB 472 and BEFB 474.

BESC - Bioenvironmental Sci (BESC)

BESC 201 Introduction to Bioenvironmental Sciences  
Credits 3. 3 Lecture Hours.
A broad survey of environmental science with an emphasis on scientific literacy, current events, global and international issues and historic context.

BESC 204 Molds and Mushrooms: The Impact of Fungi on Society and the Environment  
Credits 3. 3 Lecture Hours.
Introduction to the fungi and the impact these organisms have on society and the environment; includes life cycles of fungi; classification schemes, pathogens of plants, animals and humans, fungi in food production; toxic fungi and the law, and others.

BESC 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.
Individually supervised research or advanced studies for lower-division undergraduate students to independently investigate special problems not available in existing courses.  
Prerequisite: Approval of instructor in consultation with departmental advisor.

BESC 291 Research  
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in bioenvironmental sciences. May be repeated 3 times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

BESC 311 International Perspectives on Environmental Issues  
Credits 3. 3 Lecture Hours.
Role of the United Nations and other institutions that promote international cooperation toward sustainable development goals; influence of cultural views on critical thinking about environmental issues, including population, water and agriculture, biodiversity and energy.  
Prerequisite: Junior classification or approval of instructor; must attend two mandatory pre-departure meetings.

BESC 314 Pathogens, the Environment and Society  
Credits 3. 3 Lecture Hours.
The impact of microorganisms (bacteria, fungi and viruses) on the development of modern culture and society; the role pathogens played in the history of mankind and the influence of the changing environment on emerging diseases.  
Prerequisite: Junior or senior classification.

BESC 320 Water and the Bioenvironmental Sciences  
Credits 3. 3 Lecture Hours.
Critical understanding of salient issues relating to fresh water as a limited and important bioenvironmental resource.  
Prerequisite: Junior or senior classification.

BESC 357 Biotechnology for Biofuels and Bioproducts  
Credits 3. 3 Lecture Hours.
Biotechnology issues in developing bioenergy as a renewable energy source; emphasis on the three generations of bioenergy and enabling technologies; special topics include recent advances in bioenergy research, government policy, and industrial development.  
Prerequisite: BESC 201 and junior or senior classification.

BESC 367 U.S. Environmental Regulations  
Credits 3. 3 Lecture Hours.
Investigation of the legal infrastructure of the U.S. associated with regulating environmental impacts; examination of major U.S. environmental statutes associated with air and water quality, toxic substances, waste and hazardous substance release, energy and natural resources; review the relationship between U.S. policy and international environmental regulations.  
Prerequisites: BESC 201 and junior or senior classification.

BESC 401 Bioenvironmental Microbiology  
Credits 3. 3 Lecture Hours.
The interactions of microorganisms in diverse environments; applied aspects of microbial interactions in the environment, their effects on the environment, and potential use to solve environmental problems.  
Prerequisites: SCSC 405 and 3 hours of organic chemistry, or equivalents; or approval of instructor.

BESC 402 Microbial Processes in Bioremediation  
Credits 3. 3 Lecture Hours.
Metabolic pathways of microbes involved in the biodegradation of hazardous materials will be presented; ecological requirements for biotreatability of contaminated sites will be discussed emphasizing factors affecting microbial growth; strategies for in situ bioaugmentation will be presented.  
Prerequisite: One semester of organic chemistry.

BESC 403 Sampling and Environmental Monitoring  
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to environmental sampling and methodology; strategies and analyses of sampling data; overview of current applications of sampling and monitoring in the environmental sciences; emphasis on practical aspects of sampling from air, soil and water; detection and quantification of microbial and chemical unknowns in environmental media.  
Prerequisite: Junior or senior classification, or approval of instructor.

BESC 411 Environmental Health and Safety Compliance  
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Investigation of various Environmental Health and Safety (EHS) practices necessary for compliance with state and federal regulations; reinforcement of real-world understanding; tour several regulated facilities on campus and learn about the particular TAMU-EHS compliance management strategies for each (utilities, underground storage tanks, wastewater treatment and hazardous waste facility).  
Prerequisite: BESC 367 or similar regulation intensive course and approval of instructor.
BESC 481 Seminar
Credit 1. 1 Lecture Hour.
Capstone course for topics in bioenvironmental sciences; critical analysis of environmental issues through written themes and presentations. May be taken three times for credit.
Prerequisites: BESC 201 and senior classification in BESC major.

BESC 484 Field Experience
Credits 1 to 4. 1 to 4 Other Hours.
An on-the-job supervised experience program conducted in the area of the student's specialization.
Prerequisite: Junior or senior classification or approval of department head.

BESC 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems for advanced undergraduates to permit study of subject matter not available in existing courses.
Prerequisite: BESC 201 or approval of instructor.

BESC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 1 to 4 Lab Hours.
Selected topics in an identified area of bioenvironmental sciences. May be repeated for credit.
Prerequisite: BESC 201 or approval of instructor.

BESC 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in bioenvironmental sciences. May be repeated 3 times for credit.
Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

BICH - Biochemistry (BICH)

BICH 101/GENE 101 Perspectives in Biochemistry and Genetics
Credit 1. 1 Lecture Hour.
Introduction to biochemistry and genetics and their relationship to the biological, biophysical and chemical sciences.
Prerequisite: Biochemistry and genetics major or approval of instructor.
Cross Listing: GENE 101/BICH 101.

BICH 281 Seminar in Biochemical Research
Credit 1. 1 Lecture Hour.
Round table discussions with visiting seminar speakers; review current literature; topics including cutting edge research in biochemistry.
Prerequisites: BICH 107 and freshman or sophomore classification in biochemistry or approval of instructor.

BICH 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Introduction to laboratory research.
Prerequisite: Freshman or sophomore classification in biochemistry or approval of instructor.

BICH 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of biochemistry. May be repeated for credit.
Prerequisite: Freshman or sophomore classification in biochemistry or approval of instructor.

BICH 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in Biochemistry. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor; biochemistry majors only.

BICH 303 Elements of Biological Chemistry
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Survey of the biochemical sciences designed for the non-biochemistry major; overview of the chemistry and metabolism of biologically important molecules, the biochemical basis of life processes, cellular metabolism and regulation. Students requiring biochemistry in greater depth should register for BICH 410 and BICH 411.
Prerequisite: CHEM 222 or equivalent; not open to biochemistry majors.

BICH 404 Biochemical Calculations
Credits 2. 2 Lecture Hours.
Quantitative and computational approaches to biochemical problems.
Prerequisites: BICH 440 or registration therein; junior or senior classification.

BICH 407 Horizons in Biological Chemistry II
Credit 1. 1 Lecture Hour.
Application of formal classroom instruction; applied view of biochemical concepts; use of biochemical principles to ascertain, evaluate, and make judgments on research information. May be taken five times.
Prerequisite: BICH 411 or BICH 441.

BICH 410 Comprehensive Biochemistry I
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Structure, function and chemistry of proteins and carbohydrates; kinetics, mechanisms and regulation of enzymes; metabolism of carbohydrates.
Not open to biochemistry or genetics majors.
Prerequisite: CHEM 228 or approval of instructor.

BICH 411 Comprehensive Biochemistry II
Credits 3. 3 Lecture Hours. 1 Lab Hour.
A continuation of BICH 410. Structure, function, chemistry and metabolism of lipids and nucleic acids; cellular metabolism viewed from the standpoint of energetics and control mechanisms; interrelationships of metabolic pathways. Not open to biochemistry or genetics majors.
Prerequisite: BICH 410.

BICH 412 Biochemistry Laboratory I
Credit 1. 3 Lab Hours.
Selected methods used to identify, isolate, purify and characterize biomolecules. Not open to biochemistry or genetics majors.
Prerequisite: BICH 410 or registration therein.

BICH 414 Biochemical Techniques I
Credits 2. 6 Lab Hours.
Techniques currently used in biochemistry such as spectrophotometry, column chromatography (gel filtration, ion exchange) electrophoresis and immunoelectrophoresis, performed in purification of proteins, enzymes and nucleic acids. For majors in biochemistry, genetics, molecular and cell biology and microbiology.
Prerequisite: BICH 440.

BICH 419/GENE 419 Computational Techniques for Evolutionary Analysis
Credits 3. 3 Lecture Hours.
Computational techniques for studying evolution; algorithms for construction and analysis of evolutionary relationships.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: GENE 419/BICH 419.
BICH 431/GENE 431 Molecular Genetics
Credits 3. 3 Lecture Hours.
Molecular basis for inheritance; gene structure and function, chromosomal organization, replication and repair of DNA, transcription and translation, the genetic code, regulation of gene expression, genetic differentiation and genetic manipulations.
Prerequisites: BICH 410 or BICH 440; GENE 301 or GENE 302 or GENE 320/BIMS 320.
Cross Listing: GENE 431/BICH 431.

BICH 432/GENE 432 Laboratory in Molecular Genetics
Credits 2. 6 Lab Hours.
Laboratory for molecular genetics providing technical experience with tools of molecular biology.
Prerequisite: GENE 301, GENE 302 or GENE 320/BIMS 320; BICH 410 or BICH 440.
Cross Listing: GENE 432/BICH 432.

BICH 440 Biochemistry I
Credits 3. 3 Lecture Hours.
Rigorous treatment of the structure, function and chemistry of proteins and carbohydrates; kinetics, mechanisms and regulation of enzymes; metabolism of carbohydrates. Course designed for biochemistry and genetics majors and honors students only.
Prerequisite: CHEM 228 or approval of instructor.

BICH 441 Biochemistry II
Credits 3. 3 Lecture Hours.
Continuation of BICH 440; structure, function, chemistry and metabolism of lipids and nucleic acids, cellular metabolism viewed from the standpoint of energetics and control mechanisms; interrelationships of metabolic pathways. Course designed for biochemistry and genetics majors and honors students only.
Prerequisite: BICH 440.

BICH 450/BIOL 450 Genomics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
The study of genomic data includes consideration of the logic behind the most important genomic approaches, as well as their capabilities and limitations in investigating biological processes; the science of accessing and manipulating genomic data; and practical applications, including development of an hypotheses-driven datamining experiment.
Prerequisites: BIOL 213, GENE 301 or GENE 302, BICH 431/GENE 431 or GENE 431/BICH 431, or BIOL 351; junior or senior classification or approval of instructor.
Cross Listing: BIOL 450/BICH 450.

BICH 460 Genome Annotation with Ontologies
Credit 1. 2 Lab Hours.
Use of ontologies as structured controlled vocabularies for the organization of biological data; annotation based on critical reading of the scientific literature. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

BICH 461 Advanced Genome Annotation with Ontologies
Credit 1. 2 Lab Hours.
Advanced topics in functional annotation using ontologies; usage issues and quality control for ontologies and annotations; mentoring annotation activities from BICH 460 and evaluation of annotations. May be taken three times for credit.
Prerequisite: BICH 460; junior or senior classification or approval of instructor.

BICH 464 Bacteriophage Genomics
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Examines the latest technologies in genomic analysis by sequencing and annotating the genomes of novel bacterial viruses (phage); generates real data which will be submitted to the NIH/NCBI public database; includes phage biology and potential uses.
Prerequisites: GENE 302; BIOL 351 or concurrent enrollment; approval of instructor.

BICH 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study in biochemistry not included in established courses.
Prerequisites: Junior or senior classification; approval of instructor and department head.

BICH 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of biochemistry, biophysics or nutrition. May be repeated for credit.
Prerequisite: Junior or senior classification in life or physical sciences.

BICH 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Laboratory research supervised by faculty in biochemistry or biophysics.
Prerequisite: Biochemistry major.

BIMS - Biomedical Science (BIMS)

BIMS 101 Introduction to Biomedical Science
Credit 1. 1 Lecture Hour.
Areas and opportunities in the varied fields of applied biology, professional programs, and the allied health industry. Open to all majors interested in the life sciences as related to health and disease.

BIMS 110 One Health in Action
Credit 1. 1 Lecture Hour.
Exploration of the concept of One Health; the interconnected and interdependent health of humans, animals and ecosystems; the conceptual framework that encompasses human and veterinary medical sciences, agricultural sciences, food safety, public health, epidemiology, environmental health, toxicology, wildlife ecology and conservation and many related fields of study or research.
Prerequisite: Freshman or sophomore classification or approval of instructor.

BIMS 201 Introduction to Phenotypic Expression in the Context of Human Medicine
Credits 2. 2 Lecture Hours.
Study of human genetics with respect to gene expression as it pertains to the cell cycle, development, cancer, aging and epigenetics; discussions and debates surrounding medical examples and case studies.
Prerequisite: BIOL 112, CHEM 227; or approval of instructor.

BIMS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of biomedical science. May be repeated for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

BIMS 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in biomedical sciences. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.
BIMS 301 Biomedical Sciences Study Abroad
Credits 2 to 12. 2 to 12 Lecture Hours.
For students in approved programs abroad. May be repeated for credit. Maximum 3 hours free elective credit in the BIMS degree plan. Must be taken on a satisfactory/unsatisfactory basis.

BIMS 320/GENE 320 Biomedical Genetics
Credits 3. 3 Lecture Hours.
Fundamental genetic principles as applied to biomedical science; Mendelian inheritance, linkage and genetic mapping, mutagenesis and pedigree analysis; molecular basis of gene function and inherited disease; gene therapy and genetic counseling. Credit cannot be given for both GENE 301 and GENE 320/BIMS 320.
Prerequisites: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.
Cross Listing: GENE 320/BIMS 320.

BIMS 392 Cooperative Education in Biomedical Science
Credits 2. 20 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be assigned. May be repeated for credit.
Prerequisites: Approval of the college coordinator of cooperative education; BIMS major with a minimum overall 2.5 TAMU GPA.

BIMS 405/GENE 405 Mammalian Genetics
Credits 3. 3 Lecture Hours.
Comparative mammalian genetic systems with emphasis on laboratory animals; organization and expression of mammalian genes; development and use of genetically defined animals in biomedical and genetic research.
Prerequisites: GENE 301, BIMS 320/GENE 320 or GENE 320/BIMS 320; junior or senior classification.
Cross Listing: GENE 405/BIMS 405.

BIMS 421/GENE 421 Advanced Human Genetics
Credits 3. 3 Lecture Hours.
A rigorous, analytical approach to genetic analysis of humans including diagnosis and management of genetic disease in humans; transmission of genes in human populations; human cytogenetics; the structure of human genes; human gene mapping; molecular analysis of genetic disease; genetics screening and counseling.
Prerequisites: BIMS 320/GENE 320 or GENE 320/BIMS 320; BICH 410 or 440; junior or senior classification.
Cross Listing: GENE 421/BIMS 421.

BIMS 452/GENE 452 Modifying Mammalian Genomes for Biomedical Research
Credits 3. 3 Lecture Hours.
Review advances in the production of transgenic animals, the manipulation of embryonic stem cells for transgenics and therapeutics, the modification of specific genes in mammalian species by homologous recombination and RNA interference; special emphasis on genetic manipulation of cells and animals for biomedical research, stem-cell and gene therapy.
Prerequisite: BIMS 320/Gene 320, GENE 301 or 320.
Cross Listing: GENE 452/BIMS 452.

BIMS 481 Seminar in Biomedical Science
Credit 1. 1 Other Hour.
Recent advances in biomedical sciences. To be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification in life sciences majors; BIMS major with a minimum overall 2.5 TAMU GPA.

BIMS 484 Biomedical Science Field Experience
Credits 2. 2 Other Hours.
On-the-job training in the Biomedical Science industry; development of objectives and goals; evaluation by supervisor required.
Prerequisite: Approval of department head; BIMS major with a minimum overall 2.5 TAMU GPA.

BIMS 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of problems in the biomedical sciences with emphasis in the allied health professions, hospital administration, and the health-related industry approved by the instructor.
Prerequisites: Junior or senior classification; approval of instructor; BIMS major with a minimum overall 2.5 TAMU GPA.

BIMS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in an identified area of biomedical science. May be repeated for credit.
Prerequisite: Junior or senior classification; BIMS major with a minimum overall 2.5 TAMU GPA.

BIMS 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in biomedical sciences. May be repeated 2 times for credit.
Prerequisites: 3.0 TAMU GPA; BIMS 485; junior or senior classification and approval of instructor.

BIOL - Biology (BIOL)

BIOL 100 Horizons in Biology
Credit 1. 1 Lecture Hour.
Introduction to the study of biology at Texas A&M University; gain knowledge of departmental and campus resources to assist and enhance the pursuit of a degree in biology, microbiology, molecular and cellular biology or zoology.
Prerequisites: First-semester and first-time-in-college freshman majoring in BIOL, MICR, BMCB and ZOOL.

BIOL 101 Botany
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(BIOL 1311 and 1111, BIOL 1411) Botany. Structure, physiology and development of plants with an emphasis on seed plants. (Not open to students who have taken BIOL 111 and BIOL 112 or BIOL 113.); includes laboratory that reinforces and provides supplemental information related to the lecture topics.

BIOL 107 Zoology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(BIOL 1313 and 1113, 1413) Zoology. Survey of animal life with respect to cell organization, genetics, evolution, diversity of invertebrates/vertebrates, anatomy/physiology, and interaction of animals with their environment; includes laboratory that reinforces and provides supplemental information related to lecture topics. (Not open to students who have taken BIOL 111 and BIOL 112 or BIOL 113).
BIOI 111 Introductory Biology I  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
(BIOI 1306 and 1106, 1406) Introductory Biology I. First half of an introductory two-semester survey of contemporary biology that covers the chemical basis of life, structure and biology of the cell, molecular biology and genetics; includes laboratory that reinforces and provides supplemental information related to the lecture topics.  
Prerequisite: BIOI 111.  

BIOI 112 Introductory Biology II  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
(BIOI 1307 and 1107, 1407) Introductory Biology II. The second half of an introductory two-semester survey of contemporary biology that covers evolution, history of life, diversity and form and function of organisms; includes laboratory that reinforces and provides supplemental information related to the lecture topics.  
Prerequisite: BIOI 111.  

BIOI 113 Essentials in Biology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
(BIOI 1308 and BIOI 1108) Essentials in Biology. One-semester in introductory biology for non-majors; chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity and interaction of organisms with their environment; includes a laboratory to supplement and reinforce lecture topics.  

BIOI 206 Introductory Microbiology  
Credits 4. 3 Lecture Hours. 4 Lab Hours.  
(BIOI 2321 and 2121, 2421) Introductory Microbiology. Basic microbiology of prokaryotes and eukaryotes; main topics include morphology, physiology, genetics, taxonomy, ecology, medically important species and immunology; mandatory laboratory designed to give hands-on experience and to reinforce basic principles.  
Prerequisites: BIOI 101, BIOI 107, BIOI 111, or BIOI 113; CHEM 101 and CHEM 102 and CHEM 112. May not be used for credit by biology, molecular and cell biology, microbiology, zoology, predentistry or premedicine majors.  

BIOI 213 Molecular Cell Biology  
Credits 3. 3 Lecture Hours.  
Explores the molecular basis of cell structure, function and evolution; gene regulation, cell division cycle, cancer, immunity, differentiation, multicellularity and photosynthesis; may not take concurrently with, or after the completion of, BIOI 413.  
Prerequisites: BIOI 112; CHEM 102 and CHEM 112.  

BIOI 214 Genes, Ecology and Evolution  
Credits 3. 3 Lecture Hours.  
A genetically-based introduction to the study of ecology and evolution; emphasis on the interactions of organisms with each other and with their environment.  
Prerequisite: BIOI 112.  

BIOI 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Problems in various phases of plant, animal and microbial science.  
Prerequisites: Freshman or sophomore classification; approval of ranking professor in field chosen and Undergraduate Advising Office.  

BIOI 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of biology. May be repeated for credit.  
Prerequisite: Approval of instructor.  

BIOI 291 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Active research of basic nature under the supervision of a Department of Biology faculty member. May be repeated for credit.  
Prerequisites: Freshman or sophomore classification and approval of faculty member.  

BIOI 295 Research Fundamentals in the Life Sciences  
Credit 1. 1 Lecture Hour.  
First course of four in capstone research program in biology; groundwork for subsequent research-intensive courses; practical understanding of how biological research is accomplished; develop models; synthesize work; glean predictive hypothesis; design critical tests; collect and analyze data; refine or reject hypotheses.  
Prerequisite: BIOI 213 or concurrent enrollment, or approval instructor.  

BIOI 300 Research Seminar: Tropical Ecology in Costa Rica  
Credit 1. 1 Lecture Hour.  
Advanced instruction in research activities for Costa Rica; critical planning and writing skills essential in conducting research and communicating results using scientific methods and formatting.  
Prerequisites: Junior or senior classification; approval of instructor.  

BIOI 302 Careers in Biology  
Credit 1. 1 Lecture Hour.  
Development of job search skills; utilization of career resources; self-assessment of career interests and career objectives; strategies for professional correspondence and networking; business etiquette and interviewing techniques; insight into life science career opportunities.  
Prerequisites: Junior or senior classification; department of biology majors only; or approval of instructor.  

BIOI 318 Chordate Anatomy  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Classification, phylogeny, comparative anatomy, and biology of chordates; diversity, protochordates, vertebrate skeletons, shark and cat anatomy studied in laboratory.  
Prerequisite: BIOI 112.  

BIOI 319 Integrated Human Anatomy and Physiology I  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Integrated approach to cellular, neural, skeletal, muscular anatomy and physiology; includes some histology, histopathology, radiology and clinical correlations.  
Prerequisite: BIOI 111 and BIOI 112, or BIOI 107.  

BIOI 320 Integrated Human Anatomy and Physiology II  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Continuation of BIOI 319. Integrated approach to endocrine, cardiovascular, respiratory, digestive, urinary, reproductive and developmental anatomy and physiology; includes some histology, histopathology, radiology and clinical correlations.  
Prerequisite: BIOI 111 and BIOI 112, or BIOI 107; BIOI 319 or approval of instructor.  

BIOI 328 Plants and People  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Development and uses of principal economically important plants of the world; plants and plant parts used in production of important commodities; vascular plants.  
Prerequisite: BIOI 101 or BIOI 111 or BIOI 112 or approval of instructor.
BIOL 335 Invertebrate Zoology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Morphology, taxonomy, natural history and phylogeny of invertebrate animals, with emphasis on biodiversity; class includes both lecture and lab. Labs include study of preserved material and demonstration of living animals in aquaria and terraria.
Prerequisite: BIOL 112 or approval of instructor.

BIOL 344 Embryology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to general and comparative embryology; molecular and cellular mechanisms of development; genetics and early development of selected invertebrates (C. elegans, Drosophila and sea urchin) and emphasis on vertebrates (frog, fish, chick and mouse).
Prerequisite: BIOL 213 or GENE 302.

BIOL 350 Computational Genomics
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Hands-on approach to obtaining, organizing and analyzing genome-related data; emphasis on asking and answering biologically relevant questions by designing and performing experiments using computers; understanding biology from a computational perspective.
Prerequisite: Junior or senior classification in life sciences, engineering, mathematics, chemistry.

BIOL 351 Fundamentals of Microbiology
Credits 4. 3 Lecture Hours. 4 Lab Hours.
Introduction to modern microbiology with emphasis on prokaryotes; includes microbial cell structure, function, and physiology; genetics, evolution, and taxonomy; bacteriophage and viruses; pathogenesis and immunity; and ecology and biotechnology; includes laboratory experience with microbial growth and identification.
Prerequisites: BIOL 112; CHEM 227, and CHEM 237 or CHEM 231; or approval of instructor.

BIOL 352 Diagnostic Bacteriology
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Practical experience in handling, isolation and identification of pathogenic microorganisms using biochemical tests and rapid identification techniques.
Prerequisite: BIOL 206 or BIOL 351.

BIOL 357 Ecology
Credits 3. 3 Lecture Hours.
Analysis of ecosystems at organismal, population, interspecific and community levels. BIOL 358 is the laboratory for this lecture course.
Prerequisite: BIOL 112 or approval of instructor.

BIOL 358 Ecology Laboratory
Credit 1. 3 Lab Hours.
Quantitative analyses of freshwater and terrestrial ecosystems; includes data sampling and presentation of results in written and oral formats; required fieldtrips; analysis of competition and predator-prey interactions using ecological models.
Prerequisite: BIOL 357 or concurrent enrollment; junior or senior classification.

BIOL 388 Principles of Animal Physiology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to how animals function, including basics of neurophysiology, endocrinology, muscular, cardiovascular, respiratory, osmoregulatory, and metabolic physiology; broadly comparative in scope and encompassing adaptation of physiological systems to diverse environments; the laboratory stresses techniques used for monitoring and investigating physiological mechanisms and responses to environmental changes.
Prerequisites: BIOL 112; CHEM 228.

BIOL 395 Directed Investigation in Bioinformatics
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Second course of four in capstone research program in biology; conduct individual research projects utilizing bioinformatic tools.
Prerequisite: BIOL 213 or approval of instructor.

BIOL 400 Tropical Ecology Costa Rica
Credits 6. 2 Lecture Hours. 12 Lab Hours.
Advanced field course taught at multiple field stations in Costa Rica; emphasis on biological, ecological, natural history and philosophical attributes of tropical ecosystems; includes planning and conducting a field-oriented research project, and presentation of results.
Prerequisites: BIOL 300 and approval of instructor; junior or senior classification.

BIOL 401 Critical Writing in Biology
Credit 1. 1 Lecture Hour.
Reading scientific papers and writing short synopses of papers with a focus on learning how to think and write like a scientist; fills the current Writing Intensive “W” course requirement for biology.
Prerequisites: BIOL 213 and BIOL 214; junior or senior classification.

BIOL 405 Comparative Endocrinology
Credits 3. 3 Lecture Hours.
Basic principles of endocrinology including structure and functions of hormones in vertebrates; hormonal control of growth, metabolism, osmoregulation, and reproduction; endocrine techniques and mechanism of hormone action.
Prerequisites: BIOL 213 and CHEM 227; BIOL 320 or BIOL 388 strongly recommended.

BIOL 406/GENE 406 Bacterial Genetics
Credits 3. 3 Lecture Hours.
A problem oriented course surveying the manipulation and mechanisms of genetic systems in bacteria; recombination, structure and regulation of bacterial genes, plasmids and phages.
Prerequisites: BIOL 351; GENE 302.
Cross Listing: GENE 406/BIOL 406.

BIOL 413 Cell Biology
Credits 3. 3 Lecture Hours.
Structure, function, and biogenesis of cells and their components; interpretation of dynamic processes of cells, including protein trafficking, motility, signaling and proliferation.
Prerequisites: BIOL 213 and BICH 410.

BIOL 414 Developmental Biology
Credits 3. 3 Lecture Hours.
Concepts of development in systems ranging from bacteriophage to the mammalian embryo; use of recombinant DNA technology and embryo engineering to unravel the relationships between growth and differentiation, morphogenesis and commitment, aging and cancer.
Prerequisite: BIOL 413 or concurrent enrollment or approval of instructor.
BIOL 423 Cell Biology Laboratory
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Modern methods of study of cell structure and cell function.
Prerequisites: BIOL 413 and BICH 412 or concurrent enrollment; approval of instructor.

BIOL 430 Biological Imaging
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Still and video photography and photomicrography, computer-based digital image analysis and processing of biological images; theory and principles of light and electron microscopy including transmission and scanning electron microscopy; optical contrast methods for light microscopy including phase contrast, DIC, polarizing light and confocal laser scanning microscopy.
Prerequisite: Junior classification or approval of instructor.

BIOL 434/NRSC 434 Regulatory and Behavioral Neuroscience
Credits 3. 3 Lecture Hours.
Cell biology and biophysics of neurons; functional organization of the vertebrate nervous system; physiological basis of behavior.
Prerequisites: BIOL 213, BIOL 319, BIOL 388, NRSC 335/PSYC 335 or PSYC 335/NRSC 335.
Cross Listing: NRSC 434/BIOL 434.

BIOL 435 Laboratory for Regulatory and Behavioral Neuroscience
Credit 1. 3 Lab Hours.
Study of modern methods and tools used to investigate nervous system structure and function.
Prerequisite: Approval of instructor.

BIOL 437 Molecular and Human Medical Mycology
Credits 3. 3 Lecture Hours.
Principles of fungal pathogenesis, diagnosis and antifungal therapies, and relevant genetic and molecular tools for studying human pathogens and drug delivery.
Prerequisites: BIOL 351; junior or senior classification; or approval of instructor.

BIOL 438 Bacterial Physiology
Credits 4. 4 Lecture Hours.
Structure and function of prokaryotic cells, with emphasis on evolutionary adaptations to different environmental, developmental, and pathogenic selections pressures; formation of teams and preparation of presentations on specific topics in microbiology.
Prerequisites: BIOL 351; BIOL 406/GENE 406 or concurrent enrollment; BICH 410, BICH 431/GENE 431 and GENE 302 strongly recommended.

BIOL 440 Marine Biology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to biology of common organisms inhabiting bays, beaches and near-shore oceanic waters with special reference to Gulf of Mexico biota; emphasis on classification, distribution, history, ecology, physiology, mutualism, predation, major community types and economic aspects of marine organisms.
Prerequisite: BIOL 112 or approval of instructor.

BIOL 445 Biology of Viruses
Credits 3. 3 Lecture Hours.
Structure, composition and life cycles of viruses; methods used to study viruses; their interaction with host cells; mechanisms of pathogenicity and cellular transformation; responses of the host to viral infection, and vaccine applications; in-depth study of the life cycles of the major classes of viruses and discussion of emerging viruses.
Prerequisite: BIOL 213 or BIOL 351 or approval of instructor.

BIOL 450/BICH 450 Genomics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
The study of genomic data includes consideration of the logic behind the most important genomic approaches, as well as their capabilities and limitations in investigating biological processes; the science of accessing and manipulating genomic data; and practical applications, including development of an hypotheses-driven datamining experiment.
Prerequisites: BIOL 213, GENE 301 or GENE 302, BICH 431/GENE 431 or GENE 431/BICH 431, or BIOL 351; junior or senior classification or approval of instructor.
Cross Listing: BICH 450/BIOL 450.

BIOL 451 Bioinformatics
Credits 3. 3 Lecture Hours.
Introduction to the entire field of bioinformatics; theoretical background of computational algorithms, with an emphasis on application of computational tools related to modern molecular biological research.
Prerequisite: Junior or senior classification, or approval of instructor.

BIOL 452 Fungal Functional Genomics
Credits 4. 3 Lecture Hours. 4 Lab Hours.
Extensive research experience in eukaryotic molecular genetics using the fungus Neurospora crassa as the primary model system; analysis of Neurospora gene-deletion strain collection to examine the effects of genes on the organism’s traits; introduction of molecular techniques for genome manipulation and analysis.
Prerequisite: Junior or senior classification in any life science major or approval of instructor.

BIOL 454 Immunology
Credits 3. 3 Lecture Hours.
Introduction to basic immunological concepts and principles of serology.
Prerequisite: BIOL 351 or equivalent or approval of instructor.

BIOL 455 Laboratory in Immunology
Credits 2. 6 Lab Hours.
Practical application of serological principles which include precipitation, agglutination and blood banking principles; techniques in tissue culture and hybridoma technology also included.
Prerequisite: BIOL 454 or registration therein.

BIOL 456 Medical Microbiology
Credits 3. 3 Lecture Hours.
Microbiology, epidemiology and pathology of human pathogens with an emphasis on bacterial agents.
Prerequisite: BIOL 351 or approval of instructor.

BIOL 461 Antimicrobial Agents
Credit 1. 1 Lecture Hour.
Understanding of antimicrobial agents, limitations of use, biosynthesis and regulation, and challenges in development as new therapeutics.
Prerequisites: BICH 410 or BICH 440 and BIOL 351 or VTPB 405.

BIOL 462/WFSC 462 Amazon River Tropical Biology
Credits 3. 3 Lecture Hours.
History, ecology, evolutionary-biology, geography and culture of the Amazon River and Rio Negro; exploration of the world’s most bio-diverse river during a 10-day expedition from Manaus, Brazil; survey biota, record observations about the ecosystem, select research topics, development of presentations.
Prerequisites: BIOL 107, BIOL 112, BIOL 113, BIOL 357 or RENR 205; or approval of instructor.
Cross Listing: WFSC 462/BIOL 462.
BIOL 463 Epigenetic Mechanisms and Inheritance
Credits 3. 3 Lecture Hours.
Knowledge of chromatin structure, the mechanisms of chromatin
inheritance and the consequences of heritable chromatin structures
on gene expression; phenomenology, molecular underpinnings and
evolutionary implications.
Prerequisite: Junior or senior classification or approval of instructor.

BIOL 466 Principles of Evolution
Credits 3. 3 Lecture Hours.
Evolutionary patterns, mechanisms and processes at the organismal,
chromosomal and molecular levels; modes of adaptation and the
behavior of genes in populations.
Prerequisite: GENE 302 or approval of instructor.

BIOL 467 Integrative Animal Behavior
Credits 3. 3 Lecture Hours.
Examines how behavior contributes to survival and reproduction, and
how evolutionary history and ecological circumstance interact to shape
the expression of behavior; focus on integrative nature of behavior; how
the interaction of evolutionary processes, mechanistic constraints, and
ecological demands determine behavioral strategies.
Prerequisite: BIOL 214, BIOL 357, BIOL 388, BIOL 405, BIOL 434/
NRSC 434, or BIOL 466, or approval of instructor.

BIOL 480 Departmental Colloquium
Credit 1. 1 Lecture Hour.
Attend presentations given by renowned scientists from various fields of
biology; learn about new developments in science; stay abreast of current
and trending research topics.
Prerequisites: Senior classification; majors in BIOL, MICRO, BMCB and
ZOOL.

BIOL 481 Seminar in Biology
Credit 1. 1 Lecture Hour.
Recent advances. Restricted to senior undergraduate majors in biology,
microbiology, botany or zoology.

BIOL 484 Internship
Credits 0 to 4. 0-1 Other Hours.
Directed internship in a private firm or public agency to provide research
experience appropriate to the student's degree program and career
objectives. May be taken two times.
Prerequisite: Approval of internship agency and advising office.

BIOL 485 Directed Studies
Credits 1 to 12. 1 to 12 Other Hours.
Problems in various phases of plant, animal and bacteriological science.
Prerequisites: Junior classification; approval of ranking professor in field
chosen and Undergraduate Advising Office.

BIOL 487/VTPB 487 Biomedical Parasitology
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Helminth and protozoan parasites of medical and veterinary importance;
life cycles, morphology, taxonomic classification, economic and public
health aspects and current topics in parasitic diseases.
Prerequisites: BIOL 107 or BIOL 112; junior or senior classification or
approval of instructor.
Cross Listing: VTPB 487/BIOL 487.

BIOL 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 10 Lab Hours.
Selected topics in an identified area of biology. May be repeated once for
credit.

BIOL 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Active research of basic nature under the supervision of a Department of
Biology faculty member. May be taken two times. Registration in multiple
sections of this course is possible within a given semester provided that
the per semester credit hour limit is not exceeded.
Prerequisite: Approval of departmental faculty member.

BIOL 493 Independent Bioinformatics Research
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Third course of four in capstone research program in biology;
continuation of research projects utilizing bioinformatic tools.
Prerequisite: BIOL 395 or approval of instructor.

BIOL 495 Biology Capstone: Research Communication in the Life
Sciences
Credits 2. 2 Lecture Hours.
Culmination of capstone research experience; formalization of research
results in written and oral forms; introduction to primary genres or
scientific writing; apply principles of rhetoric and composition to diverse
methods of professional communication.
Prerequisite: BIOL 452, BICH 464, BIOL 400, BIOL 493 or BIOL 491 or
approval of instructor.

BMEN - Biomedical Engineering
(BMEN)

BMEN 101 Introduction to Biomedical Engineering
Credit 1. 1 Lecture Hour.
Overview of biomedical engineering and the biomedical engineering
industry, including specialties, degree requirements and scholastic
programs in the Department of Biomedical Engineering.
Prerequisite: Admitted to major degree sequence.

BMEN 207 Computing for Biomedical Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to the principles of computer programming for biomedical
applications including program design and development, programming
techniques and documentation; introduction to and programming in the
LabVIEW and MATLAB environments.
Prerequisites: Admitted to major degree sequence; MATH 152,
ENGR 112.

BMEN 211 Biomedical Applications of Circuits, Signals and Systems
Credits 3. 3 Lecture Hours.
Quantitative analysis of biomedical and physiological signals; A/D
conversion and sampling; Fourier and Laplace transforms; filtering of
biomedical signals and images; electrical circuits and analog
representations of physiological systems as model systems.
Prerequisites: Admitted to major degree sequence; PHYS 208 and
MATH 308, or concurrent enrollment.

BMEN 231 Foundations of Biomechanics
Credits 3. 3 Lecture Hours.
Introduction of biomechanics in formulating and solving problems in
basic science, medical device development, and clinical intervention;
emphasis on deriving differential equations in one spatial dimension
for the five basic postulates of continuum biomechanics, identifying
illustrative constitutive relations, and providing a unified approach to
studying biosolid mechanics, biofluid mechanics, bioheat and mass
transport, and biothermomechanics.
Prerequisite: Admitted to major degree sequence in biomedical
engineering.
BMEN 253 Medical Device Design I
Credit 1. 3 Lab Hours.
FDA design controls for medical device development in a regulated environment; small-scale team biomedical engineering design project.
Prerequisite: BMEN 207.

BMEN 282/CHEN 282 Engineering Biology
Credits 3. 3 Lecture Hours.
Application of engineering principles to biological function at the molecular and cellular level.
Prerequisites: Admitted to major degree sequence and CHEM 101 and CHEM 111 or CHEM 107 and CHEM 117.
Cross Listing: CHEN 282.

BMEN 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Allows students to undertake special projects in biomedical engineering at an earlier point in their studies than required for BMEN 485.
Prerequisite: Approval of Director of Undergraduate Programs.

BMEN 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of biomedical engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

BMEN 322 Biosignal Analysis
Credits 3. 3 Lecture Hours.
Design and application of analog and digital signal analysis in biomedical engineering; characteristics of biomedical signals; design considerations for analog-to-digital and digital-to-analog circuitry; biosignal transformation methods; analog and digital filter design for biomedical signals.
Prerequisite: BMEN 321.

BMEN 341 Biofluid Mechanics
Credits 3. 3 Lecture Hours.
Introduction into the mechanics of fluids in biomechanics, including blood, synovial fluid and physiological solutions, with an emphasis on the importance of mechanobiology and the formation of biological problems within the context of 1) kinematics, 2) the concept of stress, 3) linear momentum balance, 4) constitutive relations, and 5) boundary conditions.
Prerequisites: Admitted to major degree sequence; junior or senior classification.

BMEN 342 Biomaterials and Medical Devices
Credits 3. 3 Lecture Hours.
Selection and use of materials in implantable and tissue contacting medical devices; mass transport in medical devices; regulation and testing of medical devices.
Prerequisites: VTPP 435 and BMEN 341; junior or senior classification.

BMEN 343 Introduction to Biomaterials
Credits 3. 3 Lecture Hours.
Properties of natural and man-made materials commonly encountered in biomedicine and biomedical engineering; an integrated approach in the presentation of material structures, characteristics and properties; the basics of material structures, including crystalline and chemical structure, and microstructure; and bulk properties and characteristics of the materials developed from the microscopic origins.
Prerequisites: MATH 308 and CHEM 227; junior or senior classification.

BMEN 344 Biological Responses to Medical Devices
Credits 3. 3 Lecture Hours.
Selection and characterization of materials in implantable and tissue contacting medical devices; biodegradation, biocompatibility, hemocompatibility and cell-material interactions of biomaterials.
Prerequisite: BMEN 343, VTPP 435 or concurrent enrollment.

BMEN 345 Biomaterials Lab
Credit 1. 3 Lab Hours.
Experimental methods used to prepare and characterize polymeric biomaterials used in biomedical engineering; related fundamental aspects of forming a hypothesis, experimental design, empirical observation, data collection, interpretation and presentation of data.
Prerequisite: BMEN 343.

BMEN 350 Statistics for Biomedical Engineering
Credits 3. 3 Lecture Hours.
Evaluation of the efficacy of clinical research; quantitative methods used in clinical trials in biomedical engineering; ethical and regulatory issues that must be considered during the design and implementation of any clinical trial, or pre-clinical study.
Prerequisites: Junior classification; admitted to the major degree sequence (upper level).
BMEN 353 Medical Device Design II  
Credit 1. 3 Lab Hours.  
Identification of needs for biomedical engineering design solutions, development of design proposals, analysis of design project requirements and constraints.  
Prerequisite: BMEN 253 or equivalent; junior or senior classification.

BMEN 361 Biosolid Mechanics  
Credits 3. 3 Lecture Hours.  
Introduction to the mechanics of deformable media in biomedical engineering, including medical devices, biomaterials, and soft and hard biological tissues: emphasis on biomechanics and mechanobiology and formulation of problems within the context of basic continuum biomechanics; problems include analytical solutions for stress-strain analysis of extension, distension, bending, buckling, and torsion of biosolids.  
Prerequisites: Admitted to major degree sequence in biomedical engineering; BMEN 341.

BMEN 399 Engineering Professional Development  
Credits 0. 0 Other Hours.  
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.  
Prerequisites: Admission to biomedical engineering; junior or senior classification or approval of instructor.

BMEN 400/VTPP 401 History of Human and Veterinary Medicine in Europe  
Credits 4. 4 Lecture Hours.  
Addresses the major developments in human and veterinary medicine in Europe from the Middle Ages to the present; explores key events and figures in medical history and analyzes issues of current biomedical concern in a historical context; for example, animal rights, ethics of humane experimentation, euthanasia.  
Prerequisites: Admitted to major degree sequence in biomedical engineering; VTPP 434.  
Cross Listing: VTPP 401.

BMEN 401 Principles and Analysis of Biological Control Systems  
Credits 3. 3 Lecture Hours.  
Techniques for generating quantitative mathematical models of physiological control systems and devices; the behavior of physiological control systems using both time and frequency domain methods.  
Prerequisite: BMEN 321.

BMEN 402 Biomedical Optics Laboratory  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Biomedical optics technology; basic engineering principles used in developing therapeutic and diagnostic devices; hands-on labs including optical monitoring, diagnostic and therapeutic experiments.  
Prerequisite: PHYS 208 or approval of instructor.

BMEN 404 FDA Good Laboratory and Clinical Practices  
Credits 3. 3 Lecture Hours.  
Implementation of Good Laboratory Practices (GLP) for the submission of preclinical studies and use of Good Clinical Practices (GCP) in clinical trials in accordance with Food and Drug Administration (FDA) regulations; includes similarities and differences in GLP and GCP critical for the introduction of new drugs and medical devices.  
Prerequisites: BMEN 253; junior or senior classification.

BMEN 405 Virtual Instrumentation Design for Medical Systems  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Design of medical systems using graphics programming language of LabVIEW including the designing and programming of three virtual systems as follows: cardiac monitor, electromyogram system for biomechanics, and sleep stage analyses from electroencephalograms.  
Prerequisites: BMEN 321 and BMEN 322.

BMEN 406 Medical Device Path to Market  
Credits 3. 3 Lecture Hours.  
Path to market for a medical device with specific attention to the regulatory affairs to enable the development of an appropriate regulatory strategy due to the highly regulated global environment.  
Prerequisites: BMEN 253; junior or senior classification, or approval of instructor.

BMEN 420 Medical Imaging  
Credits 3. 3 Lecture Hours.  
The principles of the major imaging modalities including x-ray radiography, x-ray computed tomography (CT), ultrasonography and magnetic resonance imaging; including a brief discussion on other emerging imaging technologies such as nuclear imaging (PET and SPECT).  
Prerequisites: BMEN 211; junior or senior classification.

BMEN 422 Bioelectromagnetism  
Credits 3. 3 Lecture Hours.  
Electric, magnetic and electromagnetic phenomena associated with biological tissues; source modeling based on physiological current including line and volume conductor models as well as electromagnetic-based stimulation, sensing and imaging.  
Prerequisites: Admission into the degree sequence of the major and BMEN 321 or approval of instructor.

BMEN 423 Microscale Bio-Optic Applications  
Credits 3. 3 Lecture Hours.  
Introduction to biomedical applications of lasers to manipulation, detection and visualization on (sub-) cellular length scales; emphasis on the governing principles on which applications are founded; includes applications from recent literature.  
Prerequisites: BMEN 306 and BMEN 322; junior or senior classification.

BMEN 424 Biomedical Sensing and Imaging at the Nanoscale  
Credits 3. 3 Lecture Hours.  
Introduction to nanotechnology with an emphasis on biomedical techniques and medical applications; basic physics of contrast agents to the engineering of current sensing and imaging systems applied at the nanoscale.  
Prerequisite: Senior classification or approval of instructor.

BMEN 425 Biophotonics  
Credits 3. 3 Lecture Hours.  
Theory and application of optical instrumentation, including light sources, lasers, detectors, and optical fibers; instrumentation and engineering in biomedical applications of optics in therapeutics, diagnostics, and biosensing.  
Prerequisites: Admitted into the major degree sequence in biomedical engineering; junior or senior classification.
BMEN 426 Optical Biosensors
Credits 3. 3 Lecture Hours.
Biosensing principles and detailed analysis of optical methods for transduction; fluorescence-based transduction; molecular recognition of targets; immobilization of sensing reagents; quantitative analysis of sensing systems; design and characterization of sensing assays and associated measurement systems; review of historical and current trends in optical biosensors.
Prerequisite: Senior classification or approval of instructor.

BMEN 427 Magnetic Resonance Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Design, construction and application of instrumentation for MR imaging; fundamentals of the architecture of an MR spectrometer and the gradient subsystem used for image localization; emphasis on the radiofrequency sensors and systems used for signal generation and reception.
Prerequisites: BMEN 420 or ECEN 410 or ECEN 411 or approval of instructor; junior or senior classification.

BMEN 428 Microcontrollers and Communications in Medical Devices
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles of embedded system architecture and programming; fundamentals and theoretical foundations of wireless communication systems; hands-on experiences of how an embedded system could be used to solve problems in biomedical engineering; projects on wireless sensors and imaging for medical devices.
Prerequisite: BMEN 211 or approval of instructor.

BMEN 430 Medical Device Regulation
Credits 3. 3 Lecture Hours.
Introduction to the regulations of the U.S. Food and Drug Administration pertaining to testing and marketing medical devices.
Prerequisites: BMEN 310; junior or senior classification.

BMEN 431 Biomolecular Engineering
Credits 3. 3 Lecture Hours.
Foundations for understanding and experimental approaches for measuring and manipulating biomolecules; proteins, nucleic acids and carbohydrates; thermodynamics and kinetics of biomolecular reactions.
Prerequisites: Junior or senior classification; Biomedical Engineering majors only; or approval of instructor.

BMEN 432 Molecular and Cellular Biomechanics
Credits 3. 3 Lecture Hours.
Introduces biomolecules and their assemblies that play structural and dynamical roles in subcellular to cellular level mechanics; emphasis on quantitative/theoretical descriptions; discussions of the relevant experiment approaches to probe these nano to micro-scale phenomena; includes topics in self-assembly of cytoskeleton and biomembranes, molecular motors, cell motility, and mechanotransduction.
Prerequisite: BMEN 361.

BMEN 433 Biomolecular and Cellular Engineering Laboratory
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Laboratory biosafety and biohazard awareness; cell culture protocols and standards for biocompatibility testing; setting protocols for cellular and biomolecular projects; bioimaging, bioassays and biomolecule activity testing.
Prerequisites: VTPP 435; BMEN 431 or concurrent enrollment; majors in biomedical engineering; junior or senior classification; or approval of instructor.

BMEN 440 Design of Medical Devices
Credits 3. 3 Lecture Hours.
Overview of the multiple issues in designing a marketable medical device, including the design process from clinical problem definition through prototype and clinical testing to market readiness; includes FDA regulation, human factors and system safety considerations and medical product liability.
Prerequisites: BMEN 342; senior classification in engineering.

BMEN 448 Healthcare Technology in the Developing World
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Principles of operation for major types of medical equipment; physiology underlying the measurement; major functional (system) pieces for each instrument; typical problems/applications of each instrument.
Prerequisites: MATH 152, PHYS 208, and approval of instructor.

BMEN 450 Case Studies
Credit 1. 1 Lecture Hour.
Examines process through which clinically defined problems are addressed from the perspective of biomedical engineering through the use of case studies; includes issues of technology transfer and clinical evaluation.
Prerequisites: Admitted to major degree sequence; junior or senior classification.

BMEN 451 Cell Mechanobiology
Credits 3. 3 Lecture Hours.
Focus on how mechanical forces influence cell behavior through physical and biochemical mechanisms; integration of engineering and cell biology to solve biomedical problems, which includes developing models for applying forces to cultured cells and tissues and measuring changes in cell biochemistry, structure, and function.
Prerequisite: BMEN 341.

BMEN 452 Mass and Energy Transfer in Biosystems
Credits 3. 3 Lecture Hours.
Transport phenomena associated with physiological systems and their interaction with medical devices; exchange processes in artificial life support systems and diagnostic equipment.
Prerequisites: BMEN 341; MATH 308.

BMEN 453 Analysis and Design Project I
Credits 2. 6 Lab Hours.
Group or team biomedical engineering analysis and design project involving statement, alternative approaches for solution, specific system analysis and design.
Prerequisites: BMEN 321 and BMEN 353.

BMEN 454 Analysis and Design Project II
Credits 2. 0 Lecture Hours. 6 Lab Hours.
Continuation of BMEN 453.
Prerequisite: BMEN 453.

BMEN 457 Orthopedic Biomechanics
Credits 3. 3 Lecture Hours.
Development of competencies in biomechanical principles using practical examples and clinical case studies; application of biomechanical knowledge to the evaluation of musculoskeletal tissues and structures, and treatment options for musculoskeletal dysfunction.
Prerequisite: BMEN 361 or equivalent course approved by instructor.
BMEN 458 Motion Biomechanics  
Credits 3. 3 Lecture Hours.  
Skeletal anatomy and mechanics; muscle anatomy and mechanics; theory and application of electromyography; motion and force measuring equipment and techniques; inverse dynamics modeling of the human body; current topics in musculoskeletal biomechanics research.  
Prerequisites: BMEN 207 or approval of instructor; junior or senior classification.

BMEN 460 Vascular Mechanics  
Credits 3. 3 Lecture Hours.  
Application of continuum mechanics to the study of the heart arteries; emphasis on the measurement and quantification of material properties, and the calculation of vascular stresses; analysis of several cardiovascular devices to reinforce the need for careful analysis in the device design.  
Prerequisites: BMEN 240.

BMEN 461 Cardiac Mechanics  
Credits 3. 3 Lecture Hours.  
Application of continuum mechanics and computational solid mechanics to the study of the mammalian heart; utilization of continuum mechanics and finite element analysis in solving non-linear boundary value problems in biomechanics.  
Prerequisites: BMEN 341 and BMEN 361.

BMEN 462 Vascular Fluid Mechanics  
Credits 3. 3 Lecture Hours.  
Bio-fluid mechanics of the human circulatory system including examination of disease development and medical treatments.  
Prerequisites: BMEN 240 or equivalent; junior or senior classification.

BMEN 463 Soft Tissue Mechanics and Finite Element Methods  
Credits 3. 3 Lecture Hours.  
Application of continuum mechanics and finite element methods to the study of the mechanical behavior of soft tissues and associative applications in biomedicine.  
Prerequisites: BMEN 341 and BMEN 361.

BMEN 465 Biomechanics Experiential Learning Lab  
Credit 1. 3 Lab Hours.  
Applications in biomechanics (solid and fluid); includes experimental methods used to investigate biomechanical factors in the assessment of therapeutic interventions; mechanical testing load frames; motion capture systems, high speed imaging and flow systems; hypothesis forming, experimental design, empirical observation, data collection and interpretation, and presentation of results.  
Prerequisite: BMEN 361.

BMEN 468 Advanced Biomechanics  
Credits 3. 3 Lecture Hours.  
Application of fluid and solid mechanics to problems in biomedical engineering ranging from molecular-level to organ-level, including the mechanics of the cell cytoskeleton, whole cells, blood, arteries and the heart.  
Prerequisites: Admitted to major degree sequence in biomedical engineering; BMEN 361; or approval of instructor.

BMEN 469 Entrepreneurial Issues in Biomedical Engineering  
Credits 3. 3 Lecture Hours.  
Description and analysis of issues associated with initiating business ventures to transfer biomedical technologies into the health care sector, including intellectual property protection, seed funding alternatives, and business strategies relevant to the biomedical engineering technology area; utilizing recent case studies of previous ventures.  
Prerequisite: Admitted to major degree sequence (upper-level) in biomedical engineering.

BMEN 470/CHEN 470 Introduction of Biomedical Optics  
Credits 3. 3 Lecture Hours.  
Fundamentals of biomedical optics; basic engineering principles used in optical therapeutics, optical diagnostics and optical biosensing.  
Prerequisites: MATH 308; PHYS 208.  
Cross Listing: CHEN 470/BMEN 470.

BMEN 471 Numerical Methods in Biomedical Engineering  
Credits 3. 3 Lecture Hours.  
Application of numerical analysis to analyze molecular, cellular and physiological systems, using general techniques including programming in MATLAB to analyze steady and dynamic systems.  
Prerequisites: BMEN 207 and VTPP 434.

BMEN 480 Biomedical Engineering of Tissues  
Credits 3. 3 Lecture Hours.  
Introduction to aspects of tissue engineering with and emphasis placed on tissue level topics including tissue organization and biological processes, with insights from recent literature (state-of-the-art).  
Prerequisite: BMEN 343.

BMEN 482 Polymeric Biomaterials  
Credits 3. 3 Lecture Hours.  
Preparation, properties, and biomedical applications of polymers including polymerization; structure-property relationships; molecular weight and measurement; morphology; thermal transitions; network formation; mechanical behavior; polymeric surface modification; polymer biocompatibility and bioadhesion; polymers in medicine, dentistry, and surgery; polymers for drug delivery; polymeric hydrogels; and biodegradable polymers.  
Prerequisite: BMEN 343.

BMEN 483 Polymeric Biomaterial Synthesis  
Credits 3. 3 Lecture Hours.  
Overview of polymer synthetic routes and key structure-property relationships with emphasis on the design of polymeric systems to achieve specific properties; tissue engineering and drug delivery applications will be used as model systems to explore the process of biomaterial design from synthesis to device evaluation.  
Prerequisite: BMEN 343 or approval of instructor.

BMEN 485 Directed Studies  
Credits 0 to 6. 0 to 6 Other Hours.  
Allows students to undertake special projects in biomedical engineering.  
Prerequisite: Approval of instructor or Director of Undergraduate Programs.

BMEN 486 Biomedical Nanotechnology  
Credits 3. 3 Lecture Hours.  
Nanotechnology applications in biomedicine; concepts of scale; unique properties at the nanoscale; biological interaction, transport, and biocompatibility of nanomaterials; current research and development of nanotechnology for medical applications, including sensors, diagnostic tools, drug delivery systems, therapeutic devices, and interactions of cells and biomolecules with nanostructured surfaces.  
Prerequisite: BMEN 343, senior classification or approval of instructor.
BMEN 487 Drug Delivery  
Credits 3. 3 Lecture Hours.  
Mechanisms for controlled release of pharmaceutically active agents and the development of useful drug delivery systems; controlled release mechanisms including diffusive, convective, and erosive driving forces by using case studies related to oral, topical and parenteral release in a frontier interdisciplinary scientific research format.  
Prerequisite: Senior classification in biomedical engineering or approval of instructor.

BMEN 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
New or unique areas of biomedical engineering which are of interest to biomedical engineering and other undergraduate students.

BMEN 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in biomedical engineering. May be repeated for credit.  
Prerequisites: Junior or senior classification and approval of instructor.

BOTN - Botany (BOTN)  

BOTN 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of botany. May be repeated for credit.  
Prerequisite: Approval of instructor.

BOTN 291 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Active research of basic nature under the supervision of a Department of Biology faculty member.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

BOTN 485 Directed Studies  
Credits 3. 3 Lecture Hours.  
Problems in various phases of plant, animal and bacteriological science.  
Prerequisites: Junior classification; approval of ranking professor in field chosen and Undergraduate Advising Office.

BOTN 491 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Active research of basic nature under the supervision of a Department of Biology faculty member.  
Prerequisites: Junior or senior classification and approval of instructor.

BUSN - Mays Business School (BUSN)  

BUSN 100 The Business Profession  
Credit 1. 1 Lecture Hour.  
Emphasis on developing professional business competencies; examines business conduct in different business settings; introduction to the necessary knowledge to become a professional through different practice activities. Students may not receive credit for both BUSN 100 and BUSN 101.  
Prerequisites: Freshman or sophomore classification; business or general studies major.

BUSN 101 Freshman Business Initiative  
Credits 3. 3 Lecture Hours.  
Freshman orientation to business and to Mays Business School; introduction to majors within the business school and associated career opportunities; introduction and development of personal and professional competencies, with emphasis on self-leadership, business communication, ethical decision making, and teamwork. Students may not receive credit for both BUSN 101 and BUSN 100.  
Prerequisite: Freshman admitted to Mays Business School.

BUSN 125 Business Learning Community I  
Credits 3. 3 Lecture Hours.  
Focuses on the base competencies that relate to effectively managing people, tasks and organizations, and change and innovation; develops skills in personal and professional competencies, analytical and critical thinking skills, written and oral communication skills, interpersonal skills and problem-solving skills; research emphasis.  
Prerequisite: Selection for Mays Business School Honors Program.

BUSN 225 Business Competency  
Credits 3. 3 Lecture Hours.  
Application of core business competencies of leadership, communication, decision making, ethics and teamwork.  
Prerequisites: BUSN 101 or BUSN 125; selection for Mays Business School Honors Program.

BUSN 232 Resource Development  
Credits 3. 3 Lecture Hours.  
Examination of resource development and the fundraising process in nonprofit organizations and social enterprises; introduction to the funding methods and interconnectedness of government, individuals, foundations and corporations as nonprofits seek to address societal challenges; overview of donor motivations, sources of support, staff/board roles in fundraising, earned income strategies and ethical practices.  
Prerequisites: Mays Business School majors only.

BUSN 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Directed study of selected problem in business not covered in other courses. May be taken two times for credit.  
Prerequisites: Freshman or sophomore classification admitted to Mays Business School and approval of instructor.

BUSN 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of business and public service. May be repeated for credit.  
Prerequisite: Freshman or sophomore in business.

BUSN 299 Professional and High Impact Experiences  
Credits 0. 0 Other Hours.  
Participation in professional and/or high impact experiences. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.

BUSN 302 Nonprofit Perspectives  
Credit 1. 1 Lecture Hour.  
Examination of the size, scope and distinctiveness of the nonprofit sector; development of a comprehensive view of the nonprofit sector by engaging with a diversity of perspectives from private, government or nonprofit organizations.  
Prerequisite: Mays Business School major; junior or senior classification or approval of instructor.
BUSD 392 Cooperative Education in Business
Credits 2. 40 Other Hours.
Educational work assignment in the field in which the student is interested. Supervision will be by employer with technical report required at semester's end. May be taken three times for credit.

BUSD 401 Mays Business Fellows I
Credits 3. 3 Lecture Hours.
A seminar for the development of leadership and management skills. Prerequisite: Selection for Mays Business Fellows Program.

BUSD 403 Personal Competency Assessment
Credits 3. 3 Lecture Hours.
Self-assessment of development of core business competencies including communication, problem-solving, management and leadership, ethical decision making, team work; compilation and evaluation of evidence of competencies; preparation of competency portfolio; creation of professional development plan. Prerequisite: BUSN 205; junior or senior classification or approval of instructor.

BUSD 432 Strategic Philanthropy
Credits 3. 3 Lecture Hours.
Examination of historical trends in philanthropy; participation in grant making process through the lens of a private foundation; engagement with local and national philanthropic leaders; development of personal philanthropic ethic through a grant making simulation that includes due diligence, writing grants and reaching collective decisions. Prerequisite: Junior or senior classification or approval of instructor.

BUSD 467 Ethics in Business
Credit 1. 1 Lecture Hour.
Integration of ethical reasoning integrity, objectivity and other core values in the development of professionals engaged in business; analyze ethical lapses that have occurred in multiple business disciplines. Prerequisite: Admission to upper division in Mays Business School.

BUSD 481 Seminar
Credit 1. 1 Lecture Hour.
Exploration of current business topics or competencies. May be taken four times for credit. Prerequisite: Junior or senior classification or approval of instructor.

BUSD 484 Internship
Credits 1 to 3. 1 to 3 Other Hours.
Professional internship or practical experience in a field in which the student is interested, under the direction of the business honors director or a business school faculty member. May be taken two times for credit. Prerequisite: Business honors major or approval of instructor.

BUSD 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Directed study on selected problems in the area of business administration not covered in other courses. May be repeated for credit. Prerequisites: Admission to upper division in Mays Business School; approval of instructor.

BUSD 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of business and public service. May be repeated for credit. Prerequisite: Junior or senior in business.

BUSD 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in Mays Business School. May be repeated 1 times for credit. Prerequisites: Junior or senior classification admitted to Mays Business School and approval of instructor.

CAEN - Ctr for Acad Enhancement (CAEN)
CAEN 101 Application of Learning Theory
Credits 2. 2 Lecture Hours.
A seminar course designed to introduce students to the resources, skills, and strategies needed to succeed in college.

CAEN 102 Career Awareness
Credits 2. 2 Lecture Hours.
Introduction to the concepts of career planning, employment trends, and methods of researching and preparing for the job market.

CARC - College of Architecture (CARC)
CARC 181 First Year Seminar
Credit 1. 1 Lecture Hour.
Seminar on various contemporary topics; introduction to high quality college instruction and research; focus on writing, speaking, exploration, discussion and research. May be taken two times for credit. Prerequisite: First time in college and College of Architecture undergraduate studies.

CARC 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.

CARC 300 College of Architecture Study Abroad
Credits 1 to 18. 1 to 18 Other Hours.
For students in approved study abroad programs participating in reciprocal educational exchange programs. May be repeated for credit. Prerequisite: Junior or senior classification; approval of assistant dean for international programs and initiatives.

CARC 301 Field Studies in Design Innovation
Credits 1 to 18. 1 to 18 Other Hours.
Design innovation in international and domestic environments away from the Texas A&M University campus; emphasis on the cultural, social, economic, geographical, climatic and technological factors influencing design solutions for human needs. May be taken up to two times in the same semester. Prerequisite: Junior or senior classification; CARC 481; approval of assistant dean for international programs and initiatives.

CARC 311 Field Studies in Design Communication
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Design communication in international and domestic environments away from the Texas A&M University campus; emphasis on the tools, methods and techniques for design communication. May be taken up to two times in the same semester. Prerequisite: Junior or senior classification; approval of assistant dean for international programs and initiatives.
CARC 321 Field Studies in Design Technology  
Credits 3. 3 Other Hours.  
Design technology in international and domestic environments away from the Texas A&M University campus; emphasis on structural, material and environmental systems and methods of construction utilized to realize design solutions. May be taken up to two times in the same semester. 
Prerequisite: Junior or senior classification; approval of assistant dean for international programs and initiatives.

CARC 331 Field Studies in Design Philosophy  
Credits 3. 3 Other Hours.  
Design philosophy in international and domestic environments away from the Texas A&M University campus; emphasis on the historical, philosophical, cultural, social and economic factors that influence design solutions. May be taken up to two times in the same semester. 
Prerequisites: Junior or senior classification; approval of assistant dean for international programs and initiatives.

CARC 481 Seminar  
Credit 1. 1 Lecture Hour.  
Preparatory seminar for select College of Architecture study away and internships; topics include introduction to the language, culture and history of study abroad location. Must be taken the spring semester before the student’s study away semester. Must be taken on a satisfactory/unsatisfactory basis. 
Prerequisites: Junior or senior classification; approval of assistant dean for international programs and initiatives.

CARC 485 Directed Studies  
Credits 1 to 6. 1 to 6 Other Hours.  
Individual research in architecture, construction science or landscape architecture in an international or domestic environment away from the Texas A&M University campus. May be taken up to two times in the same semester. 
Prerequisite: Junior or senior classification; approval of assistant dean for international programs and initiatives.

CARC 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of architecture. May be repeated for credit. 
Prerequisites: Junior or senior classification; approval of assistant dean for international programs and initiatives.

CARC 491 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of a faculty member. May be repeated 2 times for credit. 
Prerequisite: Approval of instructor.

CEHD 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of education and human development. May be repeated for credit. 
Prerequisite: Approval of instructor.

CEHD 291 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of faculty member in the College of Education and Human Development. May be repeated 2 times for credit. 
Prerequisites: Freshman or sophomore classification and approval of instructor.

CEHD 300 Education and Human Development Study Abroad  
Credits 1 to 18. 1 to 18 Lecture Hours.  
For students in approved programs to study abroad. May be repeated for credit. 
Prerequisites: Approval of department head; junior or senior classification.

CEHD 491 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of faculty member in the College of Education and Human Development. May be repeated 2 times for credit. 
Prerequisites: Junior or senior classification and approval of instructor.

CHEM 100 Horizons in Chemistry  
Credit 1. 1 Lecture Hour.  
An introduction to chemistry and its relationship to and influence on society; emphasis on chemical demonstrations and the practical application of chemical phenomena. For chemistry majors. 
Prerequisite: Major in chemistry or approval of instructor.

CHEM 101 Fundamentals of Chemistry I  
Credits 3. 3 Lecture Hours.  
(CHEM 1311, 1411) Fundamentals of Chemistry I. Introduction to modern theories of atomic structure and chemical bonding; chemical reactions; stoichiometry; states of matter; solutions; equilibrium; acids and bases; coordination chemistry. 
Prerequisites: Concurrent enrollment in CHEM 111.

CHEM 102 Fundamentals of Chemistry II  
Credits 3. 3 Lecture Hours.  
(CHEM 1312, 1412) Fundamentals of Chemistry II. Theory and applications of oxidation-reductions systems; thermodynamics and kinetics; complex equilibria and solubility product; nuclear chemistry; descriptive inorganic and organic chemistry. 
Prerequisites: Concurrent enrollment in CHEM 112.

CHEM 103 Structure and Bonding  
Credits 3. 3 Lecture Hours.  
Rigorous treatment of chemical principles and their application. 
Prerequisite: For entering students with satisfactory scores on math and chemistry placement examinations; concurrent enrollment in CHEM 113.

CHEM 104 Chemistry of the Elements  
Credits 3. 3 Lecture Hours.  
Continuation of CHEM 103. 
Prerequisite: CHEM 103 and CHEM 113; concurrent enrollment in CHEM 114.
CHEM 106 Molecular Science for Citizens
Credits 3. 3 Lecture Hours.
(CHEM 1305, 1405) Molecular Science for Citizens. Molecules that control daily life explored via a conceptual approach to molecular science; properties, synthesis, transformations and utility of important molecules and fuels, fibers, metals, pharmaceuticals, foods, biomolecules and structural materials; pollution, consumerism, energy production, disease, biotechnology and risk-benefit analysis considered.
Prerequisite: Concurrent enrollment in CHEM 116.

CHEM 107 General Chemistry for Engineering Students
Credits 3. 3 Lecture Hours.
Introduction to important concepts and principles of chemistry; emphasis on areas considered most relevant in an engineering context; practical applications of chemical principles in engineering and technology. Students completing CHEM 107 and changing majors to curricula requiring CHEM 101 and CHEM 102 may substitute CHEM 107 for CHEM 101. Students may not receive credit for both CHEM 107 and CHEM 101.
Prerequisite: Concurrent enrollment in CHEM 117.

CHEM 111 Fundamentals of Chemistry Laboratory I
Credit 1. 3 Lab Hours.
(CHEM 1111) Fundamentals of Chemistry Laboratory I. Introduction to methods and techniques of chemical experimentation; qualitative and semiquantitative procedures applied to investigative situations.
Prerequisite: CHEM 101 or registration therein.

CHEM 112 Fundamentals of Chemistry Laboratory II
Credit 1. 3 Lab Hours.
(CHEM 1112) Fundamentals of Chemistry Laboratory II. Introduction to analytical and synthetic methods and to quantitative techniques to both inorganic and organic compounds with emphasis on an investigative approach.
Prerequisites: CHEM 101 and 111 or equivalent; CHEM 102 or registration therein.

CHEM 113 Physical and Chemical Principles
Credit 1. 3 Lab Hours.
Elementary experiments in physical chemistry and quantitative analysis.
Prerequisite: CHEM 103 or registration therein.

CHEM 114 Qualitative Analysis
Credit 1. 3 Lab Hours.
Qualitative analysis, elementary inorganic syntheses and quantitative aspects of chemical equilibrium.
Prerequisites: CHEM 104 or registration therein; CHEM 113.

CHEM 116 Molecular Science for Citizens Laboratory
Credit 1. 3 Lab Hours.
(CHEM 1105, 1405) Molecular Science for Citizens Laboratory. The importance of molecular science to daily life illustrated by using experiments, demonstration and videos; designed to accompany CHEM 106.
Prerequisite: CHEM 106 or registration therein.

CHEM 117 General Chemistry for Engineering Students Laboratory
Credit 1. 3 Lab Hours.
Introduction to important concepts and principles of chemistry in the laboratory; emphasis on areas considered most relevant in an engineering context; practical applications of chemical principles in engineering and technology. Students completing CHEM 117 and changing majors to curricula requiring CHEM 111 and CHEM 112 may substitute CHEM 117 for CHEM 111. Students may not receive credit for both CHEM 117 and CHEM 111.
Prerequisites: CHEM 107 or registration therein.

CHEM 220/MSEN 220 Physics and Chemistry of Inorganic Materials
Credits 3. 3 Lecture Hours.
Structure, properties and function of materials developed from an atomistic and molecular perspective emphasizing quantum chemical descriptions; elements of solid-state chemistry and physics including bonding, crystal structure and symmetry, origin of electronic band structure, synthesis and characterization tools in materials chemistry and role of finite size effects.
Prerequisite: PHYS 208 or CHEM 102, or concurrent enrollment.
Cross Listing: MSEN 220/CHEM 220.

CHEM 222 Elements of Organic and Biological Chemistry
Credits 3. 3 Lecture Hours.
Organic chemistry and its applications to biological and agricultural chemistry, including chemistry of functional groups, acid-base and redox chemistry, stereochemistry and chemistry of important biological compounds. Not to be used as the basis for further study in organic chemistry or biochemistry.
Prerequisite: CHEM 101 or CHEM 103.

CHEM 227 Organic Chemistry I
Credits 3. 3 Lecture Hours.
(CHEM 2233, 2423) Organic Chemistry I. Introduction to chemistry of compounds of carbon; general principles and their application to various industrial and biological processes.
Prerequisite: CHEM 102 or CHEM 104. Concurrent registration in CHEM 237 is suggested.

CHEM 228 Organic Chemistry II
Credits 3. 3 Lecture Hours.
(CHEM 2235, 2425) Organic Chemistry II. Continuation of CHEM 227. Concurrent registration in CHEM 238 is suggested.

CHEM 231 Techniques of Organic Chemistry
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Techniques of organic chemistry; preparation, properties of typical organic compounds; separation, purification, analysis, and characterization of organic compounds.
Prerequisites: CHEM 112 or CHEM 114; CHEM 227 or registration therein.

CHEM 234 Organic Synthesis and Analysis IV
Credits 3. 3 Lecture Hours.
The synthesis of significant types of organic compounds and study of their properties; laboratory separations of mixtures of organic substances, identification of compounds by functional group tests and preparation of derivatives; instrumental methods of separation, identification and analysis.
Prerequisites: CHEM 228 or registration therein; CHEM 231 or CHEM 237.

CHEM 237 Organic Chemistry Laboratory
Credit 1. 3 Lab Hours.
(CHEM 2123, 2223, 2423) Organic Chemistry Laboratory. Operations and techniques of elementary organic chemistry laboratory; preparation, reactions and properties of representative organic compounds.
Prerequisites: CHEM 102, CHEM 104 or CHEM 112, CHEM 114; CHEM 227 or registration therein.

CHEM 238 Organic Chemistry Laboratory
Credit 1. 3 Lab Hours.
(CHEM 2125, 2225, 2425) Organic Chemistry Laboratory. Continuation of CHEM 237.
Prerequisites: CHEM 228 or registration therein; CHEM 237 or CHEM 231.
CHEM 242 Elementary Organic Chemistry Laboratory
Credit 1. 3 Lab Hours.
Operations and techniques of elementary organic chemistry laboratory with emphasis on experiments for students of agriculture.
Prerequisite: CHEM 222 or registration therein.

CHEM 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Introduction to research, library and laboratory work designed for the freshman or sophomore students.
Prerequisite: Approval of department head.

CHEM 289 Special Topics in...
Credits 0 to 4. 0 to 4 Other Hours.
Selected topics in an identified area of chemistry. May be repeated for credit.
Prerequisite: Approval of instructor.

CHEM 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in chemistry. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

CHEM 315 Fundamentals of Quantitative Analysis
Credits 3. 3 Lecture Hours.
Quantitative and statistical methods of analysis; solution chemistry; chemical equilibrium of analytically useful reactions; advanced analytical methods including electrochemistry, separations and kinetic methods.
Prerequisite: CHEM 102 or CHEM 104.

CHEM 316 Quantitative Analysis
Credits 2. 2 Lecture Hours.
Introductory quantitative chemical analysis; error propagation and statistics; chemical equilibrium for titrations of weak acids, polyprotic acids, and EDTA; basic chemical instrumentation including spectrophotometry, electrochemistry, and chromatography.
Prerequisite: CHEM 102 or CHEM 104.

CHEM 317 Quantitative Analysis
Credits 2. 2 Lecture Hours.
Introduction to the fundamental principles and applications of modern instrumental techniques of quantitative analysis, with emphasis on spectroscopic and chromatographic methods.
Prerequisite: CHEM 316.

CHEM 318 Quantitative Analysis Laboratory
Credit 1. 3 Lab Hours.
Laboratory work consists of selected experiments in quantitative analysis designed to typify operations of general analytical lab, including chemical analyses by volumetric and gravimetric methods; introduction to chemical measurements by spectroscopic and separations techniques and associated instrumentation.
Prerequisites: CHEM 112 or CHEM 114; CHEM 315 or CHEM 316 or registration therein.

CHEM 320 Instrumental Analysis Laboratory
Credits 2. 6 Lab Hours.
Experimental studies using modern spectroscopic, chromatographic and electroanalytical methods.
Prerequisites: CHEM 317 or registration therein; CHEM 318.

CHEM 322 Physical Chemistry for Engineers
Credits 3. 3 Lecture Hours.
Quantum theory, spectroscopy, statistical mechanics, kinetic theory, reaction kinetics, electrochemistry and macromolecules.
Prerequisites: CHEM 102 or CHEM 104; CHEM 205 and CHEM 354; MATH 152 or equivalent.

CHEM 325 Physical Chemistry Laboratory I
Credit 1. 3 Lab Hours.
Quantitative experiments involving physical chemistry principles in areas such as thermodynamics, electrochemistry, molecular structure and equilibria using modern instrumentation.
Prerequisite: CHEM 327 or registration therein.

CHEM 326 Physical Chemistry Laboratory II
Credit 1. 3 Lab Hours.
Quantitative experiments involving physical chemistry principles in such areas as kinetics, properties of gases, phase equilibria and macromolecules using modern instrumentation.
Prerequisite: CHEM 328 or registration therein.

CHEM 327 Physical Chemistry I
Credits 3. 3 Lecture Hours.
Introduction to quantum mechanics, exactly solvable model problems; many electron systems and approximate methods; chemical bonding and the electronic structure of molecules; rotational, vibrational, and electronic spectroscopy; molecular symmetry.
Prerequisite: MATH 152 or MATH 172; MATH 221, MATH 251 or MATH 253 encouraged; PHYS 208; PHYS 218. Replaces CHEM 324 in previous catalogs.

CHEM 328 Physical Chemistry II
Credits 3. 3 Lecture Hours.
A rigorous treatment of first, second, and third laws of thermodynamics; applications to gases (both ideal and real), liquids, solutions and phase equilibria; statistical thermodynamics; kinetic theory of gases; introduction to chemical kinetics.
Prerequisite: CHEM 327. Replaces CHEM 323 in previous catalogs.

CHEM 362 Descriptive Inorganic Chemistry
Credits 3. 3 Lecture Hours.
Introduction to inorganic chemistry with a focus in descriptive inorganic chemistry, bonding theories in inorganic molecules and in the solid state, redox chemistry, descriptive main group and transition metal chemistry; ligand field theory, molecular magnetism and electronic spectra in transition metal complexes.
Prerequisites: CHEM 102, CHEM 104 or equivalent.

CHEM 383 Chemistry of Environmental Pollution
Credits 3. 3 Lecture Hours.
Chemical pollutants in the air, in water and on land; their generation, chemical reactivity, action on environment and disappearance through chemical mechanisms; chemistry of existing pollution abatement.
Prerequisites: CHEM 102 or CHEM 104; junior or senior classification.

CHEM 415 Analytical Chemistry
Credits 3. 3 Lecture Hours.
Theory and practical aspects of modern instrumental methods of quantitative analysis; instrumental approaches to selectivity and sensitivity; examples of major, minor and trace component analysis.
Prerequisite: CHEM 315.
CHEM 433 Advanced Inorganic Chemistry Laboratory
Credits 2. 6 Lab Hours.
Preparation, characterization and properties of bioinorganic, organometallic and macromolecular inorganic compounds; special techniques (glove box manipulations and double-manifold Schlenk lines) for handling air-sensitive materials.
Prerequisite: CHEM 362 or registration therein.

CHEM 434 Analytical Instrumentation Laboratory
Credits 2. 6 Lab Hours.
Practical application of modern instrumental methods of quantitative analysis; atomic and molecular techniques to conduct chemical characterizations and analyses.
Prerequisite: CHEM 415 or registration therein.

CHEM 446 Organic Chemistry III
Credits 3. 3 Lecture Hours.
Principles and applications for students in chemistry, chemical engineering and biological and physical sciences; bonding, chemical reactivity, stereochemistry and synthesis.
Prerequisites: CHEM 228 and CHEM 328 or concurrent enrollment in CHEM 328.

CHEM 456 Chemical Biology
Credits 3. 3 Lecture Hours.
Application of chemical principles to biological phenomena; capstone course for advanced students, integrating organic or inorganic chemistry with biology.
Prerequisites: CHEM 228 or equivalent; junior or senior classification.

CHEM 462 Inorganic Chemistry
Credits 3. 3 Lecture Hours.
Periodic relationship of elements, their compounds, principles of their bonding and applications.
Prerequisites: CHEM 328 and CHEM 362.

CHEM 464 Nuclear Chemistry
Credits 3. 3 Lecture Hours.
Properties of the nucleus; radioactivity, decay kinetics; nuclear masses; theory of radioactive decay; nuclear reactions; radiochemistry; nuclear energy; hands-on demonstrations; applications to non-nuclear problems.
Prerequisites: CHEM 322 or CHEM 327; CHEM 315 or CHEM 316 recommended.

CHEM 466 Polymer Chemistry
Credits 3. 3 Lecture Hours.
Mechanisms of polymerization reactions of monomers and molecular weight distributions of products; principles, limitations and advantages of most important methods of molecular weight determination; relationship of physical properties to structure and composition; correlations of applications with chemical constitution.
Prerequisites: CHEM 228 and CHEM 315 or equivalents.

CHEM 468 Materials Chemistry of Inorganic Materials
Credits 3. 3 Lecture Hours.
Structure, bonding and reactivity of inorganic solids developed from a perspective emphasizing models of chemical bonding, symmetry and electronic structure; methods for characterizing extended periodic solids; descriptions of band structure and contrasts to molecular orbital theory; synthetic routes, quantum confinement and finite size effects of relevance to nanoscale materials.
Prerequisites: CHEM 102; PHYS 208; junior or senior classification.

CHEM 470 Industrial Chemistry
Credits 3. 3 Lecture Hours.
Applications of organic and inorganic chemical reactions in the manufacture of commercial products; chemistry of petroleum refining and petrochemical processing; industrial polymerization processes; commodity and fine chemical production; influence of kinetics and thermodynamics on economics of industrial chemical production; pollution abatement technology.
Prerequisites: CHEM 228; junior or senior classification.

CHEM 481 Seminar
Credits 2. 2 Lecture Hours.
Preparation of oral and written reports on selected topics from recent technical publications.

CHEM 483 Green Chemistry
Credits 3. 3 Lecture Hours.
Environmentally benign chemistry; the design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances; twelve principles of Green Chemistry; atom economy; use of renewable resources; catalysis for Green Chemistry; alternative solvents and reaction media; energy and the environment.
Prerequisites: CHEM 228; CHEM 362 recommended; junior or senior classification.

CHEM 485 Directed Studies
Credits 1 to 16. 1 to 16 Other Hours.
Introduction to research, library and laboratory work.
Prerequisites: Senior classification and approval of chemistry advisor.

CHEM 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of chemistry. May be repeated for credit.

CHEM 491 Research
Credits 0 to 10. 0 to 10 Other Hours.
Active research of basic nature under the supervision of Department of Chemistry faculty member. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Chemistry major; junior classification or approval of chemistry advisor.

CHEN - Chemical Engineering (CHEN)

CHEN 204 Elementary Chemical Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Solution of elementary problems by application of mass balances, energy balances and equilibrium relationships.
Prerequisites: Grade of C or better in CHEM 102, CHEM 112, ENGR 112, MATH 152 and PHYS 218; admission to chemical engineering major or approval of department.

CHEN 205 Chemical Engineering Thermodynamics I
Credits 3. 3 Lecture Hours.
First and second laws of thermodynamics; volumetric properties of pure fluids; heat effects; applications to flow processes, power cycles, refrigeration.
Prerequisites: CHEN 204.
CHEN 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Directed study of special projects or studies in chemical engineering processes or operations, for lower division students. Credit not applicable to degree requirements in chemical engineering.  
Prerequisites: Freshman or sophomore classification; approval of department head.  

CHEN 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of chemical engineering for lower division students. May be repeated for credit. Credit not applicable to degree requirements in chemical engineering.  
Prerequisite: Approval of instructor.  

CHEN 301 Engineering Workplace Writing  
Credits 3. 3 Lecture Hours.  
Processes for preparing documents commonly developed by engineers in the workplace; database research; electronic collaboration; ethics, planning, drafting, revising, and editing reports, proposals, correspondence, instructions, procedures, and presentations for the engineering workplace; meets ABET communication requirements.  
Prerequisites: ENGL 104 or equivalent; junior or senior classification in chemical engineering or approval by CHEN.  

CHEN 304 Chemical Engineering Fluid Operations  
Credits 3. 3 Lecture Hours.  
Fundamentals of fluid mechanics with applications to design and analysis of process equipment.  
Prerequisites: CHEN 204 with a grade of C or better; CHEN 205 or concurrent enrollment; MATH 308 with a grade of C or better.  

CHEN 313 Chemical Engineering Materials  
Credits 3. 3 Lecture Hours.  
Overview of materials science with particular emphasis on classes of materials relevant to chemical engineers.  
Prerequisite: Grade of C or better in CHEN 204, MATH 251 or concurrent enrollment, and CHEN 205 or concurrent enrollment; or approval of department.  

CHEN 320 Numerical Analysis for Chemical Engineers  
Credits 3. 3 Lecture Hours.  
Applications of numerical analysis techniques to mathematical models of processes common to chemical and associated industries; computational methods and software for analysis of chemical engineering processes.  
Prerequisites: CHEN 205 with a grade of C or better; MATH 308 with a grade of C or better; or approval of department.  

CHEN 323 Chemical Engineering Heat Transfer Operations  
Credits 3. 3 Lecture Hours.  
Heat transfer operations.  
Prerequisite: Grade of C or better in CHEN 205 and CHEN 304.  

CHEN 354 Chemical Engineering Thermodynamics II  
Credits 3. 3 Lecture Hours.  
Applications of thermodynamics to pure and mixed fluids; phase equilibria and chemical reaction equilibria.  
Prerequisites: CHEN 205 and MATH 308 with a grade of C or better; or approval of department.  

CHEN 382 Bioprocess Engineering  
Credits 3. 3 Lecture Hours.  
Application of engineering principles to design of biocatalysts and bioprocesses.  
Prerequisite: CHEN 205 with a grade of C or better; junior or senior classification.  

CHEN 399 Mid-Curriculum Professional Development  
Credits 0. 0 Other Hours.  
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.  
Prerequisites: CHEN 204 and ENGL 210; junior or senior classification or approval of instructor.  

CHEN 409 Mathematical Models of Chemical Processes  
Credits 3. 3 Lecture Hours.  
Development of the mathematical models of chemical and physical processes common to the petroleum processing, chemical and associated industries.  
Prerequisite: CHEN 424.  

CHEN 414 Chemical Engineering Laboratory I  
Credit 1. 3 Lab Hours.  
Laboratory work based on CHEN 304 and CHEN 323.  
Prerequisites: Grade of C or better in CHEN 323 and ENGL 210.  

CHEN 422/BAEN 422 Unit Operations in Food Processing  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Design of food process engineering systems; basic concepts of rheology and physical properties of foods; fundamentals of heat and mass transfer and process control.  
Prerequisites: CHEN 205 and CHEN 304, or ENGR 214.  
Cross Listing: BAEN 422/CHEN 422.  

CHEN 424 Chemical Engineering Mass Transfer Operations  
Credits 3. 3 Lecture Hours.  
Mass transfer operations with applications to design and analysis of process equipment.  
Prerequisites: Grade of C or better in CHEN 323 or concurrent enrollment and CHEN 354; or approval of department.  

CHEN 425 Process Integration, Simulation and Economics  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Integration, simulation, and economic methods involved in the design of chemical processes and equipment.  
Prerequisites: Grade of C or better in CHEN 320, CHEN 323, CHEN 354, and CHEN 424 or concurrent enrollment.  

CHEN 426 Chemical Engineering Plant Design  
Credits 3. 1 Lecture Hour. 6 Lab Hours.  
Integration of material from other chemical engineering courses with applications to the design of plants and processes representative of the chemical and related process industries.  
Prerequisites: Grade of C or better in CHEN 425 and CHEN 464.  

CHEN 430/SENG 430 Risk Analysis in Safety Engineering  
Credits 3. 3 Lecture Hours.  
Concepts of risk and risk assessment, which uses all available information to provide a foundation for risk-informed and cost-effective engineering practices; examples and exercises are drawn from a variety of engineering areas.  
Prerequisite: Junior or senior classification.  
Cross Listing: SENG 430/CHEN 430.
CHEN 431/BAEN 431 Fundamentals in Bioseparations  
**Credits 3. 3 Lecture Hours.**  
Design principles and application of chemical engineering unit operations to the production of therapeutic and bioactive molecules.  
**Prerequisite:** BAEN 302 or BMEN 282/CHEN 282 or CHEN 282 or CHEN 382.  
**Cross Listing:** BAEN 431/CHEN 431.

CHEN 433 Chemical Engineering Laboratory II  
**Credit 1. 3 Lab Hours.**  
Laboratory work based on CHEN 424, CHEN 461 and CHEN 464.  
**Prerequisites:** Grade of C or better in CHEN 414, CHEN 424, CHEN 461 and CHEN 464.

CHEN 440 Introduction to Transport Phenomena  
**Credits 3. 3 Lecture Hours.**  
Unifying principles and analytical description of phenomena of momentum transport (viscous flow), energy transport (heat conduction and convection) and mass transport (diffusion) in continuous media; similarities and differences in these phenomena.  
**Prerequisite:** Senior classification or approval of instructor.

CHEN 450 Microfabrication and Microfluidics Technology  
**Credits 3. 3 Lecture Hours.**  
Micro Electro Mechanical Systems (MEMS) technology; study the fundamentals of fluidics, heat and mass transfer, surface chemistry, and electrochemical interactions.  
**Prerequisite:** Junior or senior classification.

CHEN 451 Introduction to Polymer Engineering  
**Credits 3. 3 Lecture Hours.**  
Fundamentals of polymer reaction kinetics, morphology, chemical and rheological properties with applications to polymer synthesis, production and processing operations.  
**Prerequisite:** Senior classification in chemical engineering or approval of instructor.

CHEN 455/SENG 455 Process Safety Engineering  
**Credits 3. 3 Lecture Hours.**  
Applications of engineering principles to process safety and hazards analysis, mitigation, and prevention, with special emphasis on the chemical process industries; includes source modeling for leakage rates, dispersion, analysis, relief valve sizing, fire and explosion damage analysis, hazards identification, risk analysis, accident investigations.  
**Prerequisite:** Senior classification in any engineering major.  
**Cross Listing:** SENG 455/CHEN 455.

CHEN 456 Advanced Chemical Process Optimization I  
**Credits 3. 3 Lecture Hours.**  
State-of-the-art optimization based techniques for process synthesis, process design and process operability; emphasis on mathematical modeling via mixed integer and continuous optimization formulations and application to heat integration problems; use modeling/optimization software systems.  
**Prerequisites:** Senior classification or approval of instructor.

CHEN 458 Fundamentals of Environmental Remediation Processes  
**Credits 3. 3 Lecture Hours.**  
Fundamental approach to various remediation technologies; topics in environmental thermodynamics and mass transfer; adsorption, desorption, ion exchange, air stripping extractions, chemical oxidation, biodegradation.  
**Prerequisites:** CHEN 354 and CHEN 424.

CHEN 459 Gas and Petroleum Processing  
**Credits 3. 3 Lecture Hours.**  
Design and operation of petroleum and gas processing facilities including hydrate suppression, dehydration, sweetening, sulfur recovery, LPG and liquid recovery, refining operations; analysis of the design and operations involving a large degree of process simulation.  
**Prerequisites:** CHEN 323 and approval of instructor.

CHEN 460/SENG 460 Quantitative Risk Analysis in Safety Engineering  
**Credits 3. 3 Lecture Hours.**  
Fundamental concepts, techniques, and applications of risk analysis and risk-informed decision making for engineering students; practical uses of probabilistic methods are demonstrated in exercises and case studies from diverse engineering areas.  
**Prerequisite:** Senior or graduate classification.  
**Cross Listing:** SENG 460/CHEN 460.

CHEN 461 Process Dynamics and Control  
**Credits 3. 3 Lecture Hours.**  
Analysis of process dynamics and methods for the design of automatic control systems for chemical process plants.  
**Prerequisite:** Grade of C or better in CHEN 320 and CHEN 464 or concurrent enrollment.

CHEN 463 Systems Biology  
**Credits 3. 3 Lecture Hours.**  
Experimental and computational techniques in systems biology; includes high throughput experiments, data analysis, modeling and simulation; discussed in the context to specific applications such as signal transduction.  
**Prerequisite:** CHEN 382 or approval of instructor.

CHEN 464 Kinetics and Reactor Design  
**Credits 3. 3 Lecture Hours.**  
Kinetics of reactions and application of fundamental principles to design and operation of commercial reactors.  
**Prerequisites:** Grade of C or better in CHEN 320, CHEN 323, and CHEN 424 or concurrent enrollment, or approval of department.

CHEN 469 Chemical Engineering Car Design  
**Credit 1. 1 Lecture Hour.**  
Application of chemical, physical and engineering principles in design process, idea generation and development of design concepts, economic, safety and performance analysis. May be taken four times for credit.  
**Prerequisites:** CHEN 204, CHEN 205; junior or senior classification or approval of instructor.

CHEN 470/BMEN 470 Introduction of Biomedical Optics  
**Credits 3. 3 Lecture Hours.**  
Fundamentals of biomedical optics; basic engineering principles used in optical therapeutics, optical diagnostics and optical biosensing.  
**Prerequisites:** MATH 308; PHYS 208.  
**Cross Listing:** BMEN 470/CHEN 470.

CHEN 471/BAEN 471 Bioreactor Engineering  
**Credits 3. 3 Lecture Hours.**  
Fundamentals of microbial and enzyme kinetics; basic biochemical reaction theory and reactor systems; heterogeneous reactions and transport considerations in enzyme and cell reactors, and immobilized systems; bioreactor design considerations in bioprocessing.  
**Prerequisite:** CHEN 282 or CHEN 382 or BAEN 302; junior or senior classification in engineering or approval of instructor.  
**Cross Listing:** BAEN 471/CHEN 471.
CHEN 475 Microelectronics Process Engineering
Credits 3. 3 Lecture Hours.
State-of-the-art process engineering principles on microelectronics, especially for the fabrication of very large scale integrated circuits (VLSICs); fundamental unit processes, such as thin film deposition, thermal growth, lithography, etching and doping, material structures and properties, and basic device operation principles.
Prerequisites: CHEN 354 and CHEN 464 or approval of instructor;
CHEM 322.

CHEN 481 Seminar
Credit 1. 2 Lab Hours.
Preparation of oral and written reports on selected topics from recent technical publications.
Prerequisites: Junior or senior classification in chemical engineering; ENGL 210 with a grade of C or better.

CHEN 485 Directed Studies
Credits 1 to 5. 1 to 5 Other Hours.
Work covers one or more problems in chemical engineering processes or operations.
Prerequisite: Approval of department head.

CHEN 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of chemical engineering. May be repeated for credit.
Prerequisite: Senior classification in chemical engineering or approval of instructor.

CHEN 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in chemical engineering. May be repeated 2 times for credit.
Prerequisites: Junior or Senior classification and approval of instructor.

CHIN - Chinese (CHIN)

CHIN 101 Beginning Chinese I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(CHIN 1411) Beginning Chinese I. Introduction to Chinese language, culture and history; development of communicative skills in daily conversation; ability to read and write some commonly used Chinese characters.

CHIN 102 Beginning Chinese II
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(CHIN 1412) Beginning Chinese II. Further development of communicative skills in different aspects of daily Chinese conversation; ability to read and write about 150 commonly used characters.
Prerequisite: CHIN 101 with a grade of C or better.

CHIN 201 Intermediate Chinese I
Credits 3. 3 Lecture Hours.
(CHIN 2311) Intermediate Chinese I. Development of comprehension and production of spoken Chinese, with emphasis on connected discourse; acquisition of advanced language points; ability to read and write 250 or more characters.
Prerequisite: CHIN 102 with a grade of C or better.

CHIN 202 Intermediate Chinese II
Credits 3. 3 Lecture Hours.
(CHIN 2312) Intermediate Chinese II. Continued development of effective communication skills in different daily situations; ability to read and write simple, short paragraphs in Chinese.
Prerequisite: CHIN 201 with a grade of C or better.

CHIN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects in Chinese, selected for each student individually; written or oral reports.
Prerequisite: Approval of instructor and Director of AALO.

CHIN 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Chinese studies. May be repeated for credit.
Prerequisite: Approval of instructor.

CHIN 301 Reading and Composition
Credits 3. 3 Lecture Hours.
Development of advanced proficiency in reading and writing through contact with various written and spoken styles of modern Chinese as reflected in newspaper reports, radio and TV broadcasts.
Prerequisites: CHIN 202; junior or senior classification or approval of instructor.

CHIN 302 Reading and Composition II
Credits 3. 3 Lecture Hours.
Advanced proficiency in reading comprehension through contact with various written materials; development of cultural proficiency; development of writing skills with emphasis on new characters, new vocabulary and new sentence structures.
Prerequisites: CHIN 301; junior or senior classification or approval of instructor.

CHIN 405 Modern Chinese Fiction
Credits 3. 3 Lecture Hours.
Analysis of major Chinese literary and other prose works of the twentieth and twenty-first centuries; taught in English. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

CHIN 456/FILM 465 Chinese Film
Credits 3. 3 Lecture Hours.
Consideration and analysis of major works and directors of Chinese film; interpretation of culture through film; relationship of film to history, literature and other arts; taught in English. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: FILM 465/CHIN 456.

CHIN 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects selected for each student individually; written or oral reports.
Prerequisite: Approval of instructor and Director of AALO.

CHIN 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Chinese studies. May be repeated for credit.
Prerequisite: Approval of instructor.

CHIN 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research in Chinese studies conducted under the direction of faculty member approved by the Director of AALO. May be taken 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.
CLAS - Classics (CLAS)

CLAS 101 Beginning Classical Greek I
Credits 4. 4 Lecture Hours.
Introduction to the language and culture of Greece; basic grammar and vocabulary; readings and slide lectures designed to place language study in its cultural and artistic context.

CLAS 102 Beginning Classical Greek II
Credits 4. 4 Lecture Hours.
Continuation of CLAS 101; basic grammar and vocabulary; readings and slide lectures designed to place language study in its cultural and artistic context.
Prerequisite: CLAS 101.

CLAS 121 Beginning Latin I
Credits 4. 4 Lecture Hours.
(LATI 1411) Beginning Latin I. Introduction to grammar and vocabulary with a contrastive approach; reading of graded material.

CLAS 122 Beginning Latin II
Credits 4. 4 Lecture Hours.
(LATI 1412) Beginning Latin II. Completion of elementary grammatical structures; introduction to Latin historians.
Prerequisite: CLAS 121.

CLAS 211 Intermediate Greek
Credits 3. 3 Lecture Hours.
Completion of study of grammar and syntax; introduction to reading ancient Greek authors in the original language.
Prerequisite: CLAS 102.

CLAS 220 History of Christianity: Origins to the Reformation
Credits 3. 3 Lecture Hours.
History of Christian doctrine, ecclesiastical organization, and religious practice, origins through Reformation, with emphasis on religion and society; life and teachings of Jesus; apostolic church; patristic period; Christianization of Roman Empire and northern Europe; monasticism; medieval church; Gregorian reform; heresy; papal monarchy; schism and conciliarism; reformations of the sixteenth century.
Cross Listing: HIST 220 and RELS 220.

CLAS 221 Intermediate Latin I
Credits 3. 3 Lecture Hours.
(LATI 2311) Intermediate Latin I. Practice in reading Latin prose writings, especially historical writings and letters.
Prerequisite: CLAS 122.

CLAS 222 Intermediate Latin II
Credits 3. 3 Lecture Hours.
(LATI 2312) Intermediate Latin II. Practice in reading Latin poetry writings, especially Virgil, Horace and Ovid.
Prerequisite: CLAS 221.

CLAS 250 Greek and Roman Civilization
Credits 3. 3 Lecture Hours.
Introduction to the civilizations of classical antiquity from Bronze Age Greece to the dissolution of the Roman Empire; examination of major social, intellectual, and political developments in ancient Greece and Rome.

CLAS 251/RELS 251 Classical Mythology
Credits 3. 3 Lecture Hours.
Introduction to the most important myths of the Greeks and Romans; ancient and modern methods of interpreting myths; the role of myths in ancient literature; readings in English.
Cross Listing: RELS 251/CLAS 251.

CLAS 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Individual supervision of readings or assigned projects in Classical Languages, selected for each student individually.
Prerequisite: Approval of instructor and department head.

CLAS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Classical Languages. May be repeated for credit.
Prerequisite: Approval of instructor.

CLAS 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in classical studies. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

CLAS 311 Advanced Greek: New Testament
Credits 3. 3 Lecture Hours.
Readings of the New Testament and works contemporary with it in the original language; introduction to the linguistic, historical, literary and cultural background of the New Testament. May be repeated for credit with different readings.
Prerequisite: CLAS 211.

CLAS 312 Advanced Classical Greek Poetry
Credits 3. 3 Lecture Hours.
Readings of selections from ancient Greek authors of poetry (lyric, epic, or drama) in the original language; discussion of the intellectual, historical, and literary background of the works, and of the lives and thought of the writers. May be repeated for credit with different readings.
Prerequisite: CLAS 211.

CLAS 313 Advanced Classical Greek Prose
Credits 3. 3 Lecture Hours.
Readings of selections from ancient Greek authors of prose (history, oratory, letters, philosophy) in the original language; discussion of the intellectual, historical, and literary background of the works, and of the lives and thought of the writers. May be repeated for credit with different readings.
Prerequisite: CLAS 211.

CLAS 320 Survey of Latin Literature
Credits 3. 3 Lecture Hours.
Latin literature from the republican through the imperial period; systematic overview of the development of literary genres and themes, to provide context for the intensive study of individual authors in other courses.
Prerequisite: CLAS 222 or equivalent.

CLAS 321 Advanced Latin Prose
Credits 3. 3 Lecture Hours.
Readings of selections from ancient Roman authors of prose (history, oratory, letters, philosophy) in the original language; discussion of the intellectual, historical and literary background of the works, and of the lives and thought of the writers. May be repeated for credit with different readings.
Prerequisite: CLAS 222 or equivalent.
CLAS 322 Advanced Latin Poetry  
Credits 3. 3 Lecture Hours.  
Readings of selections from ancient Roman authors of poetry (lyric, satire, epic, or drama) in the original language; discussion of the intellectual, historical, and literary background of the works, and the lives and thought of the writers. May be repeated for credit with different readings.  
Prerequisite: CLAS 222 or equivalent.

CLAS 330 Women in Ancient Greece and Rome  
Credits 3. 3 Lecture Hours.  
Survey of women in classical Greece and Rome; emphases on female occupations and family relationships, legal and political status, traditional values, notorious women, how women were viewed and how they viewed themselves.  
Prerequisite: Junior or senior classification.

CLAS 352 Greek and Roman Drama  
Credits 3. 3 Lecture Hours.  
Dramatic literature of Ancient Greece and Rome; works of the major classical playwrights; the origins of comedy and tragedy; visual and musical aspects of production; political and intellectual ideas as reflected in the plays; readings in English.

CLAS 353/ANTH 353 Archaeology of Ancient Greece  
Credits 3. 3 Lecture Hours.  
Archaeology of ancient Greece from the Stone Age until the ascent of Rome in the Hellenistic Period; remains of ancient Greek art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figurines, votive offerings), and social history (coins, inscriptions).  
Prerequisite: Junior or senior classification.

CLAS 354/ANTH 354 Archaeology of Ancient Italy  
Credits 3. 3 Lecture Hours.  
Archaeology of ancient Italy from the Stone Age until the collapse of the Roman Empire in the fourth century; remains of ancient Etruscan and Roman art (sculpture, mosaic, painting), architecture (temples, homes, civic structures), religion (figurines, votive offerings), and social history (coins, inscriptions).  
Prerequisite: Junior or senior classification.

CLAS 361 Greek Literature in Translation  
Credits 3. 3 Lecture Hours.  
Literature of ancient Greece in its cultural context; Greek life and thought as revealed by its writers; development of the various genres of prose and poetry; readings in English.

CLAS 371 In Search of Homer and the Trojan War  
Credits 3. 3 Lecture Hours.  
The nature, background, authorship and historicity of the Iliad and the Odyssey; Aegean culture in the Stone, Bronze and early Iron ages; the value of Greek epics as historical documents; oral poetry; the Trojan War in Greek literature; readings in English.

CLAS 372 Greek and Roman Epic  
Credits 3. 3 Lecture Hours.  
Study of the ancient epic in its historical and cultural context; oral poetry; Homer, archaeology, and history; creation of Greek mythology; Alexandrian written epic; early Latin epic; Virgil’s Aeneid as national epic; Virgil and the Homeric tradition; Silver Age Latin epics; readings in English.  
Prerequisite: Sophomore classification or approval of instructor.

CLAS 381 Ancient Athletics  
Credits 3. 3 Lecture Hours.  
Study of Greek and Roman athletics in their cultural and historical contexts through the examination of ancient literary, archaeological, and artistic sources; readings in English.

CLAS 410 Seminar in Classical Studies  
Credits 3. 3 Lecture Hours.  
Exploration of a significant topic, work, or period in Greek or Roman literature, culture, or history; emphasis on development of research skills in Classical Studies. May be taken three times for credit.  
Prerequisite: Junior or senior classification, or approval of instructor.

CLAS 415/FILM 415 The Ancient World in Film  
Credits 3. 3 Lecture Hours.  
Study of modern films as they relate to ancient literary texts that inspired them or with which they share common themes; relationship between Greek epic, tragedy, and comedy and their cinematic adaptations; treatment of Rome as an idea or ideal in the work of both ancient Romans and modern filmmakers.  
Prerequisite: Junior or senior classification, or approval of instructor.  
Cross Listing: FILM 415/CLAS 415.

CLAS 417/ANTH 417 Naval Warfare and Warships in Ancient Greece and Rome  
Credits 3. 3 Lecture Hours.  
Extensive survey of Greek and Roman warships, naval warfare, naval strategy and tactics drawing upon archaeological evidence, literary documentation and iconographic material, from the Bronze Age (Ancient Egypt and the mythical Trojan War) to the Imperial Roman Navy.  
Prerequisite: Junior or senior classification.  
Cross Listing: ANTH 417/CLAS 417.

CLAS 418 European Intellectual History from Ancient Greece to the Early Middle Ages  
Credits 3. 3 Lecture Hours.  
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from Pre-Socratic Greece through the formative stages of the Christian Middle Ages.  
Prerequisite: Junior or senior classification, or approval of instructor.  
Cross Listing: HIST 418 and RELS 418.

CLAS 426/HIST 426 The Ancient Greeks  
Credits 3. 3 Lecture Hours.  
Greek History and civilization from the Archaic Age to Alexander the Great (8th-4th century B.C.).  
Prerequisite: Junior or senior classification, or approval of instructor.  
Cross Listing: HIST 426/CLAS 426.

CLAS 427/HIST 427 The Roman Republic I: The Empire Builders  
Credits 3. 3 Lecture Hours.  
Roman history and civilization from the beginnings of the Republic (6th/5th century B.C.) to the late 2nd century B.C.  
Prerequisite: Junior or senior classification, or approval of instructor.  
Cross Listing: HIST 427/CLAS 427.

CLAS 428/HIST 428 The Roman Republic II: The Civil Wars  
Credits 3. 3 Lecture Hours.  
Roman history and civilization from the late 2nd century B.C. to the 1st century A.D.  
Prerequisite: Junior or senior classification, or approval of instructor.  
Cross Listing: HIST 428/CLAS 428.
CLAS 429/HIST 429 The Roman Empire  
Credits 3. 3 Lecture Hours.  
Roman History and civilization of the Imperial Period (1st century B.C.-6th century A.D.).  
Prerequisite: Junior or senior classification, or approval of instructor.  
Cross Listing: HIST 429/CLAS 429.

CLAS 444/ANTH 444 Classical Archaeology  
Credits 3. 3 Lecture Hours.  
History of the discipline through the individuals, organizations, excavations, theoretical models and ethical issues that have shaped it.  
Prerequisites: Junior or senior classification; ANTH 353/CLAS 353, ANTH 354/CLAS 354, CLAS 353/ANTH 353 or CLAS 354/ANTH 354.  
Cross Listing: ANTH 444/CLAS 444.

CLAS 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Individual supervision of readings or assigned projects, selected for each student individually.  
Prerequisite: Approval of instructor and department head.

CLAS 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an intensified area of classical languages and culture.  
May be repeated for credit.  
Prerequisite: Approval of instructor.

CLAS 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in classical studies.  
May be taken three times for credit.  
Prerequisites: Junior or senior classification and approval of department head.

COMM - Communication (COMM)  

COMM 101 Introduction to Communication  
Credits 3. 3 Lecture Hours.  
(SPCH 1311) Introduction to Communication. Survey of communication topics, research, and contexts of communicative practice; overview of communication from both humanities and social science perspectives.

COMM 107 Introduction to the Health Humanities  
Credits 3. 3 Lecture Hours.  
Introduction to the methods and approaches of the health humanities; exposure to key scholarship in this field as well as major methods and approaches; application of such skills to the analysis of cultural case studies such as illness narratives or contemporary debates in scientific bioethics.  
Cross Listing: ENGL 107, HIST 107, and HHUM 107.

COMM 203 Public Speaking  
Credits 3. 3 Lecture Hours.  
(SPCH 1315) Public Speaking. Training in speeches of social and technical interest designed to teach students to develop and illustrate ideas and information and to inform, stimulate, and persuade their audiences.

COMM 205 Communication for Technical Professions  
Credits 3. 3 Lecture Hours.  
Design and presentation of oral reports for technical professions; incorporation of visual and graphic materials into presentation required; written reports required.

COMM 210 Group Communication and Discussion  
Credits 3. 3 Lecture Hours.  
(SPCH 2333) Group Communication and Discussion. Definition, structure, and functions of groups; group productivity, codes in verbal and nonverbal communication; problem-solving, role-playing, decision-making; leadership and organization; interview principles and techniques.

COMM 215/JOUR 215 Interviewing: Principles and Practice  
Credits 3. 3 Lecture Hours.  
Theory and practice of methods in selected interview settings; emphasis on communication between two persons, questioning techniques, and the logical and psychological bases of interpersonal persuasion.  
Cross Listing: JOUR 215/COMM 215.

COMM 230/JOUR 230 Communication Technology Skills  
Credits 3. 3 Lecture Hours.  
Introduction to interactive media and media literacy skills in the digital domain; survey of technology histories, standards and markets for industries such as multichannel TV, digital radio, video games, streaming media, epublishing, teleconferencing and social networking.  
Prerequisite: Communication or telecommunication media studies majors.  

COMM 240 Rhetorical Criticism  
Credits 3. 3 Lecture Hours.  
Principles and practice of the analysis of speeches and other forms of public discourse; compares systems of rhetorical criticism, such as neo-classical analysis, mythic analysis, rhetorical genres and close textual analysis.

COMM 243 Argumentation and Debate  
Credits 3. 3 Lecture Hours.  
(SPCH 2335) Argumentation and Debate. Principles of argumentation and skills of debate, including reasoning, evidence, refutation, and briefing.

COMM 250/JOUR 250 New Media and the Independent Voice  
Credits 3. 3 Lecture Hours.  
Examination of new media as independent voices for cultural and political movements; principles governing the design, presentation, and evaluation of blogs as a persuasive medium in society.  
Cross Listing: JOUR 250/COMM 250.

COMM 257 Communication, Religion and the Arts  
Credits 3. 3 Lecture Hours.  
Introduction to artistic, religious communication; survey of communication art and media art practices across religious contexts; consideration of communication aesthetics that mediate religious experience.  
Cross Listing: RELS 257.

COMM 280 Careers in Communication  
Credit 1. 1 Lecture Hour.  
Introduction to careers in communication; emphasis on strengths and personality in selecting a profession, application letters, information interviews, mock interviews; must be taken on satisfactory/unsatisfactory basis.  
Prerequisites: Sophomore classification or approval of instructor; COMM and TCMS majors.

COMM 285 Directed Studies  
Credits 1 to 3. 1 to 3 Other Hours.  
Individual supervision of readings or assigned projects in communication. May be taken two times for credit.  
Prerequisites: Approval of instructor and department head.
COMM 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of communication. May be repeated for credit.
Prerequisite: Approval of instructor.

COMM 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in the department of communication. May be repeated 3 times for credit.
Prerequisites: GPA 2.5 or higher; freshman or sophomore classification and approval of instructor and department head.

COMM 301 Rhetoric in Western Thought
Credits 3. 3 Lecture Hours.
Historical and critical evaluation of rhetorical theory from the classical era to the contemporary period--from Aristotle to Kenneth Burke. Major theories of communication and persuasion developed in Europe and America.
Prerequisite: Junior or senior classification.

COMM 302 The Mass Media and Politics
Credits 3. 3 Lecture Hours.
Examination of mass media impact on politics and political behavior, and governmental impact on the mass media.
Prerequisite: POLS 206 or approval of department head; junior or senior classification.
Cross Listing: POLS 302.

COMM 305 Theories of Communication
Credits 3. 3 Lecture Hours.
Theoretical approaches to human communication, including selected theories of language behavior, interpersonal and small group interaction, and persuasion.
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 307/JOUR 301 Mass Communication, Law, and Society
Credits 3. 3 Lecture Hours.
Mass media as social institutions; social responsibility and ethics of the press; history, constitutional development, and law of the First Amendment.
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
Cross Listing: JOUR 301/COMM 307.

COMM 308 Research Methods in Communication
Credits 3. 3 Lecture Hours.
Survey of methods used in communication research including quantitative, interpretive and rhetorical methods, formulating research questions, determining the appropriate method, planning and designing the research, data collection, and data analysis and interpretation.
Prerequisite: MATH 141 or MATH 166, and MATH 131 or MATH 142 or MATH 151 or PHIL 240; or MATH 151 and MATH 152.

COMM 315 Interpersonal Communication
Credits 3. 3 Lecture Hours.
Speech interaction in person-to-person settings; concepts of perception, attraction, self-disclosure, listening, and conflict management through communication; speech interaction patterns and stages in the development of interpersonal communication.
Prerequisite: Junior or senior classification.

COMM 320 Organizational Communication
Credits 3. 3 Lecture Hours.
Speech communication behavior and networks within organizations; recent research on speech communication systems, communication climate, and communication barriers in organizational settings.
Prerequisite: Junior or senior classification.

COMM 321 Strategic Communication Case Studies
Credits 3. 3 Lecture Hours.
Strategic communication practice; application of skills including communication research, media writing and advanced media writing, visual media and public speaking; service-learning as not-for-fee consultant to a community organization.
Prerequisites: COMM 323 and junior or senior classification or approval of instructor.

COMM 322 Communication Tactics
Credits 3. 3 Lecture Hours.
Examination of strategic use of communication tactics; analysis of new and digital media in organizational and public communication; skill development in strategic use of communication tactics including writing for new media, researching, planning, integrating and evaluating effectiveness of traditional and new media tactics in strategic public communication.
Prerequisite: COMM 323, junior or senior classification.

COMM 323 Strategic Communication
Credits 3. 3 Lecture Hours.
Application of strategic communication tools to create and influence policy, to improve profit and non-profit strategic communication planning.
Prerequisite: Junior or senior classification.

COMM 324 Communication Leadership and Conflict Management
Credits 3. 3 Lecture Hours.
Communication perspective of leadership, of conflict, of management of conflict in interpersonal, group and societal contexts; models of leadership as communication phenomenon; use of symbols by leaders to foster collaboration, systemic constructionist approach.
Prerequisite: Junior or senior classification.

COMM 325 Persuasion
Credits 3. 3 Lecture Hours.
Theory of effective persuasive communication in interpersonal, small group, and public settings; audience analysis, ethics of persuasion, motivational factors, psychological and rhetorical principles, source credibility, and theories of attitude change.
Prerequisite: Junior or senior classification.

COMM 327 American Oratory
Credits 3. 3 Lecture Hours.
Survey of significant American oratory; critical analysis of important speeches in their historical, political, social, and philosophical contexts.
Prerequisite: Junior or senior classification.

COMM 330 Technology and Human Communication
Credits 3. 3 Lecture Hours.
Nontechnical survey of how modern technologies influence human communication including an introduction to communication technologies; the influence of technology on interpersonal communication, group decision-making and public communication; an analysis of argumentation and persuasion in technological issues.
COMM 335 Intercultural Communication  
Credits 3.3 Lecture Hours.  
Communication variables in intercultural contexts including culture and meaning, nonverbal styles across cultures, patterns of symbolic transfer, culture shock and communication, values in intercultural dialogue.  
Prerequisite: Junior or senior classification.

COMM 340 Communication and Popular Culture  
Credits 3.3 Lecture Hours.  
Survey of theories and concepts of popular culture; dynamic relationships between pop culture and television, film, sports, politics and leisure.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 345/FILM 345 Media Industries  
Credits 3.3 Lecture Hours.  
Survey of the business organization, economic structures and processes, and regulations of the media industry.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.  
Cross Listing: FILM 345/COMM 345.

COMM 350 Theories of Mediated Communication  
Credits 3.3 Lecture Hours.  
Survey of different theories of mediated communication processes and effects; functions of theories in social scientific research on media and mediated processes.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 354 Political Economy of Telecommunication  
Credits 3.3 Lecture Hours.  
Survey of the political economy of the telecommunication industries both at the national and global level, including regulations and policies, global infrastructure and types of networks.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 360 Cultural History of the Media  
Credits 3.3 Lecture Hours.  
Origins and development of the mass media; their influence on social, political, and cultural change; history of mass communication from historical, sociological, and cultural perspectives.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 365/JOUR 365 International Communication  
Credits 3.3 Lecture Hours.  
Mass media, international, and cross-cultural audiences; theoretical, pragmatic, political and ethical issues; including cultural differences, comparative media systems, development communication, patterns of world news flow, political propaganda, impact of international advertising and other issues.  
Prerequisite: Junior or senior classification.  
Cross Listing: JOUR 365/COMM 365.

COMM 367 Media and the Middle East  
Credits 3.3 Lecture Hours.  
Examination of how media (e.g., literature, news, film, television) contribute to our understanding of historical events in the Middle East; analysis of cultural, social, political and historical circumstances of media representation of events; exploration of various media genres’ techniques and narrative structure. May be taken two times for credit with a focus on different medium.  
Prerequisite: Junior or senior classification or approval of instructor.

COMM 370 Health Communication  
Credits 3.3 Lecture Hours.  
Survey of theory and research in health communication, including interaction between patients and providers, communication in health care organizations, health care campaigns, and cultural meanings of health and illness.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 375 Media Audiences  
Credits 3.3 Lecture Hours.  
Media audiences; research and theory; processes and effects of mass communication; audience members’ uses and interpretations of media; topics including political media, news, and entertainment, health and information campaigns, children and other special audiences.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 403 Media, Children and Adolescents  
Credits 3.3 Lecture Hours.  
Critical analysis of popular culture and mass media issues related to children and adolescents; deconstruction of media created by, for and about children and youth.  
Prerequisite: Junior or senior classification or approval of instructor.

COMM 407/WGST 407 Women, Minorities and the Mass Media  
Credits 3.3 Lecture Hours.  
The contributions of women and ethnic groups to the evolution of the media; the portrayal of women and ethnic groups in the mass media; issues resulting from the recognition of women and ethnic groups as media audiences.  
Prerequisites: Junior or senior classification and approval of instructor.  
Cross Listing: WGST 407/COMM 407. Majors only or approval of program coordinator.

COMM 408 Advanced Research Methods in Communication  
Credits 3.3 Lecture Hours.  
Advanced research methods in communication including experimental, survey, interpretive, and critical methods; emphasis on research design, data collection, analysis, interpretation, and presentation.  
Prerequisite: Junior or senior classification; COMM 308.

COMM 410 Radio, Records, and Popular Music  
Credits 3.3 Lecture Hours.  
History of radio and record industries; communication technology and media industries related to American popular music; interaction of communication technologies, media industries, social and cultural processes in evolution of popular music.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 411/WGST 411 Representations of Motherhood  
Credits 3.3 Lecture Hours.  
Examination of understandings of motherhood from a humanities perspective and over a variety of cultures and time periods, as reflected in written, media and/or oral texts.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: WGST 411/COMM 411.

COMM 415 New Media and Civil Society  
Credits 3.3 Lecture Hours.  
Critical analysis of new media technologies, civic participation, and social capital in democratic, non-democratic, and nascent civil societies around the world.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.
COMM 420/WGST 420 Gender and Communication
Credits 3. 3 Lecture Hours.
Survey of the role of gender in communication processes; focus on communication differences between men and women in contexts such as the family, school and work organizations; discussion of media influence in gender stereotypes.
Cross Listing: WGST 420/COMM 420.

COMM 425/AFST 425 Rhetoric of the Civil Rights Movement
Credits 3. 3 Lecture Hours.
Rhetorical evaluation of theoretical literature and pragmatic episodes that shaped the U.S. Civil Rights Movement; examination of significant speeches, documents, and protest activities in their historical, political, and social contexts.
Cross Listing: AFST 425/COMM 425.

COMM 428/WGST 428 Women's Rhetoric
Credits 3. 3 Lecture Hours.
Examination of the historical imbrication of masculinity and rhetoric in relation to women's participation in political life, reception of women's rhetoric in the public sphere, and remembrance and representation of women as rhetorical agents throughout history; consideration of women's rhetoric in various cultural arenas.
Prerequisite: Junior or senior classification.
Cross Listing: WGST 428/COMM 428.

COMM 431 Rhetoric of Social Movements
Credits 3. 3 Lecture Hours.
Survey of events and rhetorical documents of major U.S. social movements, including abolitionist, labor, socialist, women's rights, civil rights, pro-life, gay and lesbian, and student movements.
Prerequisites: COMM 301; junior or senior classification.

COMM 434 Topics in Rhetorical Theory
Credits 3. 3 Lecture Hours.
Application of rhetorical theories and concepts to rhetorical problems and methods; emphasis on the relationship between theory and practice. May be taken two times for credit.
Prerequisite: Junior or senior classification.

COMM 435/FILM 445 Rhetoric of Television and Film
Credits 3. 3 Lecture Hours.
Critical analysis of television and film; close readings of such mediated texts; special attention to writing television and film criticism.
Prerequisite: Junior or senior classification.

COMM 437 Visual Communication
Credits 3. 3 Lecture Hours.
Critical analysis of visual communication including photographs, advertising, memorials, tattoos, comics, public protest.
Prerequisite: Junior or senior classification.

COMM 438 Propaganda
Credits 3. 3 Lecture Hours.
Examination of common propaganda strategies in contemporary mass mediated environments.
Prerequisite: Junior or senior classification.

COMM 440 Political Communication
Credits 3. 3 Lecture Hours.
Rhetorical analysis of messages, media and speakers in political campaigns, institutions and movements.

COMM 443 Communication and Conflict
Credits 3. 3 Lecture Hours.
Communication principles for addressing conflict situations through such practices as negotiation, mediation and arbitration; the study of strategies, influence and language in conflict management approaches.
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 446 Communication, Organizations and Society
Credits 3. 3 Lecture Hours.
Communicative processes through which organizations influence and are influenced by the societies from which they draw their members.
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 447 Communication, Group Processes and Collaboration
Credits 3. 3 Lecture Hours.
Communication processes in teamwork including collaboration in dyads, teams, and group processes that contribute to or detract from team effectiveness.
Prerequisites: COMM 210; junior or senior classification.

COMM 449 Activism and Communication
Credits 3. 3 Lecture Hours.
Examination of communicative behaviors used by individuals, grassroots, and established organizations in strategic ways to advocate on behalf of issues, groups, or actions perceived as pro-social or for the betterment of society.
Prerequisite: Junior or senior classification.

COMM 450 Media Campaigns
Credits 3. 3 Lecture Hours.
Principles of designing media campaigns as applied to commercial advertising, political advertising and health campaigns; processes that drive the planning and execution of these campaigns.
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.

COMM 452 Cultural Studies of Communication Technology
Credits 3. 3 Lecture Hours.
Exploration of theories concerning technology; emphasis on technological culture; examination of the emergence of and societal reactions to technologies during modern era; consideration of utopian/dystopian discourse of technology in popular media narratives; contemplation of technology as constitutive of power and knowledge.
Prerequisite: Junior or senior classification.

COMM 453 Communication and Video Games
Credits 3. 3 Lecture Hours.
Business and industry aspects of video games; cultural and social aspects of gaming.
Prerequisite: Junior or senior classification.

COMM 454 Telecommunication Policy
Credits 3. 3 Lecture Hours.
Telecommunication policy, including intellectual property, first amendment protections, privacy, universal service, government support, national information policy, standard setting and deregulation; implications for managers and consumers of telecommunication.
Prerequisites: COMM 354; junior or senior classification.
COMM 458/JOUR 458 Global Media  
Credits 3. 3 Lecture Hours.  
Study of globalization through media ownership; content, flow, cultural values, political power and technological impact; implications of globalization for local economies and audiences.  
Prerequisite: Any lower-division communication course, or junior classification, or approval of instructor.  
Cross Listing: JOUR 458/COMM 458.

COMM 460 Communication and Contemporary Issues  
Credits 3. 3 Lecture Hours.  
Rhetorical and other critical approaches to study how communication practices influence the construction of social issues. May be taken two times.

COMM 470 Communication in Health Care Contexts  
Credits 3. 3 Lecture Hours.  
Principles of health communication applied in situations ranging from physician-patient communication to public health campaign theory, design, implementation and evaluation. May be taken two times.

COMM 471 Media, Health and Medicine  
Credits 3. 3 Lecture Hours.  
Analysis and evaluation of representations of health in media; examination of gender, class and race as they intersect with health issues.  
Prerequisite: Junior or senior classification.

COMM 480/RELS 480 Religious Communication  
Credits 3. 3 Lecture Hours.  
The role of religious communication as manifested in speeches, sermons, debates, campaigns, and social movements throughout history. May be taken two times for credit.  
Cross Listing: RELS 480/COMM 480.

COMM 482 Health Humanities Senior Seminar  
Credits 3. 3 Lecture Hours.  
Capstone course; application of skills and knowledge acquired during health humanities concentration coursework; exposure to specialized methods of inquiry; development and execution of an individualized final project.  
Prerequisites: HHUM 107; junior or senior classification.  
Cross Listing: ENGL 482, HIST 482, and HHUM 482.

COMM 484 Internship in Communication  
Credits 0 to 23. 0 to 23 Other Hours.  
Directed internship in a public or private organization to provide students with on-the-job training and applied research experience; application of communication theory and practice in career settings; designed to enhance and clarify students’ career objectives. May be repeated for credit. Must be taken S/U.  
Prerequisites: Cumulative GPR of 2.5 or higher for credits taken in residence; approval of department head.

COMM 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Directed individual study of identified topics in communication; may include specific research, readings or other approved project in any area of communication; written report is required. May be repeated for credit.  
Prerequisites: Cumulative GPR of 2.5 or higher; approval of instructor and department head.

COMM 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of communication. May be repeated for credit.

COMM 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of faculty member in the department of communication. May be taken four times for credit.  
Prerequisites: GPA 2.5 or higher; junior or senior classification and approval of instructor and department head.

COMM 497 Independent Honors Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Directed independent studies for upper division Honors students, regardless of academic major, in select aspects of communication. May be repeated for credit.  
Prerequisites: Junior or senior classification either as Honors student or with GPR of 3.25; letter of approval from head of student’s department.

COSC - Construction Science (COSC)

COSC 153 Introduction to the Construction Industry  
Credits 3. 3 Lecture Hours.  
Characteristics of the construction industry; types of construction companies; contracts; people involved in a project, their responsibilities and interrelationships; evolution of a project; interpreting working drawings; construction bonds; contract documents.

COSC 175 Construction Graphics Communication  
Credits 3. 3 Lecture Hours.  
Visualization, interpretation and communication of graphical geometry in construction design and engineering; graphical analysis of problems; sketching applications, computer aided design, and fundamentals of information modeling software; introduction to common quantitative tools in construction.  
Prerequisite: COSL majors only.

COSC 202 Introduction to Housing  
Credits 3. 3 Lecture Hours.  
Overview of the social, economic, environmental and cultural impacts of housing on communities and nations; varied perspectives to understand the different facets of housing and their impacts on the human experience; critical thinking skills to gain knowledge and to be informed of housing choices.

COSC 253 Construction Materials and Methods I  
Credits 3. 3 Lecture Hours.  
(ARCH 2312) Construction Materials and Methods I. Materials, methods and sequences of the construction process; emphasis on design, specification, purchase and use of concrete, masonry and wood.

COSC 254 Construction Materials and Methods II  
Credits 3. 3 Lecture Hours.  
Analysis of materials and methods used in the design and construction of buildings with a particular emphasis on structures using structural steel reinforced concrete and dimensional framing lumber.  
Prerequisite: COSC 253.

COSC 275 Estimating I  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Systems approach to determining required quantities of construction materials; quantification of various types of foundation systems, structural systems and building envelope systems; excerpts of contract documents from a variety of different building projects.  
Prerequisites: COSC 175; COSC 254.
COSC 284 Introduction to Applied Workplace Ethics, Etiquette and Communications
Credits 3. 3 Lecture Hours.
For students in an experiential learning environment; required reading assignments on topics concerning workplace ethics, etiquette and communications; apply and discuss reflective writing assignments in order to prepare to meet the professional expectations of employers upon graduation.
Prerequisite: Engaged in an internship, co-op or other experiential learning opportunity working a minimum of 20 hours per week.

COSC 285 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Special project in construction science. Project must be approved by the department.
Prerequisite: Approval of department head.

COSC 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in construction science. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification; approval of instructor.

COSC 301 Construction Surveying
Credits 2. 0 Lecture Hours. 4 Lab Hours.
Practical applications of surveying to the practice of construction project management; distance, grade and angular measurement; surveying equipment and its application to construction layout and control; surveying documentation and field work; introduction to other three dimensional measurement and positioning systems.
Prerequisite: Admission to upper level in Construction Science.

COSC 310 Design and Construction Leadership Education I
Credit 1. 1 Lecture Hour.
Promotion of personal leadership skills utilized within the design and construction professions; primary understanding and developing management skills with specific attention to developing personal attributes and skills necessary for achieving organizational goals.
Prerequisites: CARC majors only pursuing the minor in leadership in the design & construction professions; junior or senior classification or approval of instructor.

COSC 321 Structural Systems I
Credits 3. 3 Lecture Hours.
Introduction to the physical principles that govern classical statics and strengths of materials through the design of architectural structures.
Prerequisite: Admission to upper level in Construction Science.

COSC 325 Mechanical, Electrical and Plumbing Systems in Construction I
Credits 3. 3 Lecture Hours.
Design, operation, materials and installation methods of mechanical, electrical and plumbing systems in construction.
Prerequisite: Admission to upper level in construction science or minor in facility management.

COSC 326 Mechanical, Electrical and Plumbing Systems in Construction II
Credits 3. 3 Lecture Hours.
In depth coverage of mechanical, electrical and plumbing (MEP) system operations, materials and installation methods; development of MEP drawings, specifications and contract documents as used in MEP specialty contracting industry.
Prerequisite: COSC 325.

COSC 326 Project Management for Facility Managers
Credits 3. 3 Lecture Hours.
Overview of project management for facility managers covering concepts and components of project management and their interrelationships in construction practice.
Prerequisite: Minor in facility management; junior or senior classification or approval of instructor.

COSC 333 Construction Project Management
Credits 3. 3 Lecture Hours.
An introduction to construction project management covering concepts of project selection, estimating bidding, scheduling, subcontracting practices, cost controls, project documentation, construction bonds, insurance, payments and the elements of close out; development of professional communication skills through prepared multi-media presentations.
Prerequisite: Admission to upper level in Construction Science.

COSC 334 Construction Safety I
Credit 1. 1 Lecture Hour.
Administration and application of the OSHA Act in the construction industry; includes standards, the general duty clause, competent person, and hazard identification; fulfills the requirements for the ten-hour OSHA certifications.
Prerequisite: Admission to upper level in Construction Science.

COSC 353 Construction Project Management
Credits 3. 3 Lecture Hours.
Overview of project management for facility managers covering concepts and components of project management and their interrelationships in construction practice.
Prerequisite: Minor in facility management; junior or senior classification or approval of instructor.

COSC 364 Construction Safety I
Credit 1. 1 Lecture Hour.
Introduction to construction project management covering concepts of project selection, estimating bidding, scheduling, subcontracting practices, cost controls, project documentation, construction bonds, insurance, payments and the elements of close out; development of professional communication skills through prepared multi-media presentations.
Prerequisite: Admission to upper level in Construction Science.

COSC 375 Estimating II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Quantification and pricing of direct field costs and general condition costs from construction documents; the preparation of complete lump sum bid package ready for project execution; complete set of contract documents required.
Prerequisites: Admission to upper level in Construction Science; COSC 275.

COSC 381 Professional Ethics in the Construction Industry
Credit 1. 1 Lecture Hour.
Principles of ethical behavior in preparation for a professional internship with a construction or construction-related company; various construction company case studies emphasizing personal accountability, integrity, moral courage, individual, association and company codes of conduct; accepted business practices, decision making, company cultures, peer pressure, public opinion.
Prerequisite: Admission to upper level in Construction Science.

COSC 410 Design and Construction Leadership Education II
Credit 1. 1 Lecture Hour.
Principles of ethical behavior in preparation for a professional internship with a construction or construction-related company; various construction company case studies emphasizing personal accountability, integrity, moral courage, individual, association and company codes of conduct; accepted business practices, decision making, company cultures, peer pressure, public opinion.
Prerequisite: Admission to upper level in Construction Science.

COSC 410 Design and Construction Leadership Education II
Credit 1. 1 Lecture Hour.
Principles of ethical behavior in preparation for a professional internship with a construction or construction-related company; various construction company case studies emphasizing personal accountability, integrity, moral courage, individual, association and company codes of conduct; accepted business practices, decision making, company cultures, peer pressure, public opinion.
Prerequisite: Admission to upper level in Construction Science.

COSC 410 Design and Construction Leadership Education II
Credit 1. 1 Lecture Hour.
Principles of ethical behavior in preparation for a professional internship with a construction or construction-related company; various construction company case studies emphasizing personal accountability, integrity, moral courage, individual, association and company codes of conduct; accepted business practices, decision making, company cultures, peer pressure, public opinion.
Prerequisite: Admission to upper level in Construction Science.
COSC 411 Seminar in Design and Construction Executive Leadership
Credit 1. 1 Lecture Hour.
Promotes an understanding of leadership and builds the capacity to understand and meet the challenges involved in developing and leading ethical and sustainable organizations in today’s economy; examination of theory, conceptualizing, reflection and application; share experiences in everyday life and learn to predict outcomes based on theoretical models.
Prerequisite: COSC 410; CARC majors only pursuing the minor in leadership in the design and construction; junior or senior classification or approval of instructor.

COSC 421 Soil and Structural Analysis.
Credits 3. 3 Lecture Hours.
Advanced structural analysis of steel and concrete members with an introduction to soil properties and constituents; utilization of computer analysis tools.
Prerequisite: COSC 321.

COSC 440 Interdisciplinary Capstone
Credits 4. 4 Lecture Hours.
A senior capstone for students preparing to enter the design-build sector of the construction industry; integration of the design and construction processes into a single, cohesive project delivery system, starting with project inception, and carrying through construction, operation and maintenance of various types of construction projects.
Prerequisites: COSC 475; must be taken last full semester or summer before graduation.

COSC 441 Residential Capstone
Credits 4. 4 Lecture Hours.
A senior capstone course for students preparing to enter the residential construction industry; project management of residential projects, including market analysis, site analysis, residential design, building codes, estimating, scheduling, financing, subcontracting, marketing, business planning and current trends in design and construction.
Prerequisites: COSC 475; must be taken last full semester or summer before graduation.

COSC 442 Commercial Capstone
Credits 4. 4 Lecture Hours.
A senior capstone course for students preparing to enter the commercial construction sector; project management of commercial construction projects, including aspects of design, bidding/estimating; presentation, value engineering, contracts/negotiation, subcontractor relations, cost controls, management during construction, close out, and post-construction requirements.
Prerequisites: COSC 475; must be taken last full semester or summer before graduation.

COSC 443 Industrial Capstone
Credits 4. 4 Lecture Hours.
A senior capstone course for students preparing to enter the industrial construction sector; project management of industrial construction projects including project acquisition, planning and staffing, engineering, procurement, construction, start-up, close out, operations and maintenance, and turn-arounds.
Prerequisites: COSC 475; must be taken last full semester or summer before graduation.

COSC 446 Specialty Capstone
Credits 4. 4 Lecture Hours.
Senior capstone course for students preparing to enter the mechanical, electrical or other specialty construction company; project management of specialty contracts including project acquisition, schematic system design, estimating/bidding, scheduling, systems integration, value engineering, management during construction of crews and procurement, contract administration, business planning and current industry issues.
Prerequisites: COSC 475; must be taken last full semester or summer before graduation.

COSC 450 Facility Management Principles and Practices
Credits 3. 3 Lecture Hours.
Principles of facility management; the life cycle of a project; strategic planning; performance measurements; life cycle cost approach; building sustainability, maintenance management; and industry practices.
Prerequisite: Admission to upper level in construction science or minor in facility management.

COSC 459 Industrial Construction
Credits 3. 3 Lecture Hours.
Industry specific knowledge such as concepts of developing construction management strategies of industrial projects, materials and methods, structural and mechanical components; preparation to effectively resolve challenges faced in the industrial construction sector.
Prerequisites: Admission to upper level in construction science; COSC 375.

COSC 461 Building Information Modeling System
Credits 3. 3 Lecture Hours.
Exploration of a data-rich, object-oriented, and parametric digital representation of the facility, from which views and information can be extracted and analyzed for construction project acquisition, planning, and control.
Prerequisite: Admission to upper level in Construction Science.

COSC 463 Introduction to Construction Law
Credits 3. 3 Lecture Hours.
Introduction to basic contract and tort issues and their application in the construction industry; delineation of the various types of contracts and remedies available to parties involved in a construction project; additional related topics including bidding, delays, mechanics liens, site conditions, warranties and the Uniform Commercial Code as it relates to the construction industry, introduction to legal research and reasoning as used by professional constructors.
Prerequisite: Admission to upper level in Construction Science.

COSC 464 Construction Safety II
Credits 3. 3 Lecture Hours.
Administration and application of the Occupational Safety and Health Administration Act in the construction industry; includes OSHA standards, the general duty clause, competent person and hazard identification; fulfills the requirements for the thirty-hour OSHA, CPR and First Aid certifications.
Prerequisite: Admission to upper level in construction science; COSC 364.
COSC 465 Advanced Topics in Construction Law  
**Credits 3. 3 Lecture Hours.**  
Legal issues affecting construction, including the parties to construction work, contracting, responsibilities and risk, risk management, damages, handling of claims and disputes, indemnification, bonds, insurance, bankruptcy, labor and employment, and subcontract management; litigation and alternative dispute resolution methods regularly used in the construction industry.  
**Prerequisite:** COSC 463.

COSC 468 Risk Management in the Built Environment  
**Credits 3. 3 Lecture Hours.**  
Decision-making and risk analysis concepts in the context of the built environment and construction projects; major categories and tools of risk management regularly used in the construction industry such as contracts, insurance and bonds.  
**Prerequisites:** Admission to upper level in construction science and COSC 463 or concurrent enrollment.

COSC 474 Facility Management Internship  
**Credits 3. 3 Lecture Hours.**  
An internship (10 weeks, 400 hours) in a facility management related position that exposes the student to facility management activities; daily logs, monthly reports, final report and completion letter required; distance education off-campus course; does not satisfy College of Architecture semester away requirement.  
**Prerequisites:** COSC 450; approval of internship faculty coordinator.

COSC 475 Construction Project Planning  
**Credits 3. 2 Lecture Hours. 3 Lab Hours.**  
Development of parameter cost estimates for activities that relate to the construction of a building project; work packages sequenced, planned and leveled to develop a working project execution document; development of procedures to monitor actual field progress.  
**Prerequisite:** COSC 353, COSC 375.

COSC 477 Construction Project Controls  
**Credits 3. 3 Lecture Hours.**  
Introduction to construction related financial documents including schedule of values, labor and operations cost reports, income statements, balance sheets and construction budgets; emphasis on the development of techniques required to effectively monitor the financial aspects of a construction project.  
**Prerequisite:** COSC 353.

COSC 481 Seminar  
**Credit 1. 1 Lecture Hour.**  
Seminar discussion of construction equipment selection, utilization maintenance and operating cost.  
**Prerequisite:** Must be taken last full semester before graduation.

COSC 484 Internship - 10 Week  
**Credits 3. 3 Other Hours.**  
An internship (10 weeks, 400 hours) with a construction or construction-related company that exposes the student to construction-related activities; daily logs, monthly reports, final report and completion letter required; distance education course with non-resident status; does not satisfy College of Architecture semester away requirement.  
**Prerequisites:** COSC 364 and COSC 381; approval of internship faculty coordinator.

COSC 485 Directed Studies  
**Credits 1 to 5. 1 to 5 Other Hours.**  
Special problems in building construction.  
**Prerequisite:** Admission to upper-level in Construction Science.

COSC 489 Special Topics in...  
**Credits 1 to 4. 1 to 4 Lecture Hours.**  
Selected topics in an identified field of construction science. May be repeated for credit.  
**Prerequisite:** Admission to upper-level in Construction Science.

COSC 491 Research  
**Credits 1 to 4. 1 to 4 Other Hours.**  
Research conducted under the direction of faculty member in construction science. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
**Prerequisites:** Admission to upper level in Construction Science and approval of instructor.

COSC 494 Internship  
**Credits 7. 7 Other Hours.**  
An internship (15 weeks, 600 hours) with a construction or construction-related company that exposes the student to construction-related activities, daily logs, monthly reports, final report and completion letter required; distance education course with non-resident status. No other TAMU courses may be taken while enrolled in COSC 494.  
**Prerequisites:** COSC 364 and COSC 381; approval of internship faculty coordinator.

CSCE - Computer Sci & Engr (CSCE)

CSCE 110 Programming I  
**Credits 4. 3 Lecture Hours. 2 Lab Hours.**  
Basic concepts in using computation to enhance problem solving abilities; understanding how people communicate with computers, and how computing affects society; computational thinking; representation of data; analysis of program behavior; methods for identifying and fixing errors in programs; understanding abilities and limitation of programs; development and execution of programs.

CSCE 111 Introduction to Computer Science Concepts and Programming  
**Credits 4. 3 Lecture Hours. 2 Lab Hours.**  
Computation to enhance problem solving abilities; understanding how people communicate with computers, and how computing affects society; computational thinking; software design principles, including algorithm design, data representation, abstraction, modularity, structured and object oriented programming, documentation, testing, portability, and maintenance; understanding programs' abilities and limitations; development and execution programs.

CSCE 113 Intermediate Programming and Design  
**Credits 2. 1 Lecture Hour. 3 Lab Hours.**  
Continuation of ENGR 112; programming and design with C++; topics include design and implementation of functions, classes, and class hierarchies; software development strategies; error handling and exceptions; testing and debugging; type safety; strings; templates and the STL; graphics and GUIs; mathematical computation; and principles of object-oriented programming.  
**Prerequisites:** Knowledge of C++ programming, class design, portable graphics, and parameterized types and their implementations.
CSCE 121 Introduction to Program Design and Concepts
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Computation to enhance problem solving abilities; computational thinking; understanding how people communicate with computers, how computing affects society; design and implementation of algorithms; data types, program control, iteration, functions, classes, and exceptions; understanding abstraction, modularity, code reuse, debugging, maintenance, and other aspects of software development; development and execution of programs.
Prerequisite: Programming course (high school or college).

CSCE 181 Introduction to Computing
Credit 1. 1 Lecture Hour.
Introduction to the broad field of computing; presentations from industry and academia about how computer science concepts are used in research and end products; includes a major writing component.

CSCE 206 Structured Programming in C
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(COSC 1420) Structured Programming in C. Basic concepts, nomenclature and historical perspective of computers and computing; internal representation of data; software design principles and practice; structured and object-oriented programming in C; use of terminals, operation of editors and executions of student-written programs.

CSCE 221 Data Structures and Algorithms
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Specification and implementation of basic abstract data types and their associated algorithms including stacks, queues, lists, sorting and selection, searching, graphs, and hashing; performance tradeoffs of their associated algorithms including stacks, queues, lists, sorting and selection, searching, graphs, and hashing; performance tradeoffs of different implementations and asymptotic analysis of running time and memory usage; includes the execution of student programs written in C++.
Prerequisite: CSCE 113 or CSCE 121.
Corequisite: CSCE 222/ECEN 222.

CSCE 222/ECEN 222 Discrete Structures for Computing
Credits 3. 3 Lecture Hours.
Provide mathematical foundations from discrete mathematics for analyzing computer algorithms, for both correctness and performance; introduction to models of computation, including finite state machines and Turing machines.
Prerequisite: MATH 151.
Cross Listing: ECEN 222/CSCE 222.

CSCE 285 Directed Studies
Credits 0 to 4. 0 to 4 Lecture Hours.
Special project in computer science. Project must be approved by the department.
Prerequisite: Approval of department head.

CSCE 289 Special Topics in...
Credit 1. 1 Lecture Hour.
Selected topics in an identified area of computer science. May be repeated for credit.
Prerequisite: Approval of instructor.

CSCE 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in computer science. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

CSCE 310 Database Systems
Credits 3. 3 Lecture Hours.
File structures and access methods; database modeling, design and user interface; components of database management systems; information storage and retrieval, query languages, high-level language interface with database systems.
Prerequisites: CSCE 221 with a grade of C or better; junior or senior classification.

CSCE 312 Computer Organization
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Introduction to computer systems from programmer’s perspective including simple logic design, data representation and processor architecture, programming of processors, memory, control flow, input/output, and performance measurements; hands-on lab assignments.
Prerequisites: CSCE 221 or concurrent enrollment; junior or senior classification or approval of instructor.

CSCE 313 Introduction to Computer Systems
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Introduction to system support for application programs, both on single node and over network including OS application interface, inter-process communication, introduction to system and network programming, and simple computer security concepts; hands-on lab assignments.
Prerequisite: CSCE 221 with a grade of C or better; CSCE 312 or corequisite CSCE 350/ECEN 350.

CSCE 314 Programming Languages
Credits 3. 3 Lecture Hours.
Explores the design space of programming languages via an in-depth study of two programming languages, one subject-oriented (Java), one functional (Haskell); focuses on idiomatic uses of each language, and on features characteristic for each language.
Prerequisites: CSCE 221 or concurrent enrollment; junior or senior classification or approval of instructor.

CSCE 315 Programming Studio
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Intensive programming experience that integrates core concepts in Computer Science and familiarizes with a variety of programming/development tools and techniques; students work on 2 or 3 month-long projects each emphasizing a different specialization within Computer Science; focuses on programming techniques to ease code integration, reusability, and clarity.
Prerequisites: CSCE 312 and CSCE 314; or CSCE 350/ECEN 350.
Corequisite: CSCE 313.

CSCE 350/ECEN 350 Computer Architecture and Design
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Computer architecture and design; use of register transfer languages and simulation tools to describe and simulate computer operations; central processing unit organization; microprogramming; input/output and memory system architectures.
Prerequisites: ECEN 248 with a grade of C or better; junior or senior classification.
Cross Listing: ECEN 350/CSCE 350.

CSCE 399 High-Impact Experience
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; documentation and self-assessment of learning experience.
Prerequisite: Junior or senior classification.
CSCE 410 Operating Systems
Credits 3. 3 Lecture Hours.
Hardware/software evolution leading to contemporary operating systems; basic operating systems concepts; methods of operating systems design and construction including algorithms for CPU scheduling, memory and general resource allocation, process coordination and management; case studies of several operating systems.
Prerequisites: CSCE 313 and CSCE 315.

CSCE 411 Design and Analysis of Algorithms
Credits 3. 3 Lecture Hours.
Study of computer algorithms for numeric and non-numeric problems; design paradigms; analysis of time and space requirements of algorithms; correctness of algorithms; NP-completeness and undecidability of problems.
Prerequisite: Grade of C or better in CSCE 221 and CSCE 222/ECEN 222; junior or senior classification or approval of instructor.

CSCE 420 Artificial Intelligence
Credits 3. 3 Lecture Hours.
Fundamental concepts and techniques of intelligent systems; representation and interpretation of knowledge on a computer; search strategies and control; active research areas and applications such as notational systems, natural language understanding, vision systems, planning algorithms, intelligent agents and expert systems.
Prerequisite: CSCE 221; junior or senior classification or approval of instructor.

CSCE 431 Software Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of engineering approach to computer software design and development; life cycle models, software requirements and specification; conceptual model design; detailed design; validation and verification; design quality assurance; software design/development environments and project management.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 433 Formal Languages and Automata
Credits 3. 3 Lecture Hours.
Basic types of abstract languages and their acceptors; the Chomsky hierarchy; solvability and recursive function theory; application of theoretical results to practical problems.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 434 Compiler Design
Credits 3. 3 Lecture Hours.
Programming language translation; functions and general organization of compiler design and interpreters; theoretical and implementation aspects of lexical scanners; parsing of context free languages; code generation and optimization; error recovery.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 435 Parallel Computing
Credits 3. 3 Lecture Hours.
Overview of parallel computing technology and programming methods; includes multiprocessor architectures, programming tools, parallel performance, parallel algorithms, and applications of parallel computing.
Prerequisites: CSCE 315 and junior or senior classification or approval of instructor.

CSCE 436 Computer-Human Interaction
Credits 3. 3 Lecture Hours.
Comprehensive study of the Computer-Human Interaction (CHI) area; includes history and importance of CHI; CHI design theories; modeling of computer users and interfaces; empirical techniques for task analysis and interface design; styles of interaction and future directions of CHI including hypermedia and computer-supported collaborative work.
Prerequisite: CSCE 315 or concurrent enrollment or approval of instructor.

CSCE 438 Distributed Objects Programming
Credits 3. 3 Lecture Hours.
Principles of distributed computing and programming with current paradigms, protocols, and application programming interfaces including Sockets, RMI, CORBA, IDL, Servlets, Web Services; security issues with public/private keys, digital signatures, forms and GUI based applications with multi-tier components, database connectivity and storing/streaming data structured using XML.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 440 Quantum Algorithms
Credits 3. 3 Lecture Hours.
Introduction to the design and analysis of quantum algorithms; basic principles of the quantum circuit model; gives a gentle introduction to basic quantum algorithms; reviews recent results in quantum information processing.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 441 Computer Graphics
Credits 3. 3 Lecture Hours.
Principles of interactive computer graphics; 2-D and 3-D rendering pipelines, including geometric object and view transformations, projections, hidden surface removal, and rasterization; lighting models for local and global illumination; hierarchical models of 3-D objects; systems and libraries supporting display and user interaction.
Prerequisite: CSCE 221; junior or senior classification or approval of instructor.

CSCE 442 Scientific Programming
Credits 3. 3 Lecture Hours.
Introduction to numerical algorithms fundamental to scientific and engineering applications of computers; elementary discussion of error; algorithms, efficiency; polynomial approximations, quadrature and systems of algebraic and differential equations.
Prerequisites: CSCE 221 with a grade of C or better; MATH 304 or MATH 308 or concurrent enrollment.

CSCE 443/VIST 487 Game Development
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Aesthetic and technical aspects of computer game development, including game mechanics, story development, content creation and game programming; includes game design, interface design, 3D modeling and animation, graphics algorithms, shader programming and artificial intelligence; group project includes the design and development of a game from start to finish.
Prerequisites: CSCE 441 or VIST 486 or approval of instructor.
Cross Listing: VIST 487.
CSCE 444 Structures of Interactive Information
Credits 3. 2 Lecture Hours. 2 Lab Hours.
A systems approach to the programming, design, authoring and theory of hypermedia; object-oriented visual and interactive programming; visual design, including color, space, text and layering; the reference as a metadisciplinary structure; collecting and sampling; ontologies, maps and navigation as means of structuring information; create dynamic hypermedia that is expressive and interpretive.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 445 Computers and New Media
Credits 3. 3 Lecture Hours.
Potential and realized impact of computers in the design of new media; relationship between authors and readers of interactive material; influence of media design on the content expressed.
Prerequisite: CSCE 221 or approval of instructor.

CSCE 451 Software Reverse Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Overview of the compilation mechanism to generate executable files and raw binary codes from source codes; executable file formats for an operating system to run the binary code; disassembly algorithms and control graph analysis; static and dynamic analyses; case studies on code obfuscation, codebreaking, malware analysis.
Prerequisite: CSCE 313 or approval of instructor.

CSCE 452 Robotics and Spatial Intelligence
Credits 3. 3 Lecture Hours.
Algorithms for executing spatial tasks; path planning and obstacle averse in two- and three-dimensional robots--configuration space, potential field, free-space decomposition methods; stable grasping and manipulation; dealing with uncertainty; knowledge representation for planning--geometric and symbolic models of the environment; task-level programming; learning.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 456 Real-Time Computing
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to principles and applications of real-time computing; system architecture; D/A and A/D conversion; synchronous data acquisition and analysis; computers in real-time control; asynchronous monitoring and control; resource scheduling; interfacing issues; lectures and laboratory.
Prerequisites: CSCE 313 and MATH 152.

CSCE 462 Microcomputer Systems
Credits 3. 2 Lecture Hours. 1 Lab Hour.
Microcomputers as components of systems; VLSI processor and coprocessor architectures, addressing and instruction sets; I/O interfaces and supervisory control; VLSI architectures for signal processing; integrating special purpose processors into a system.
Prerequisite: CSCE 313.

CSCE 463 Networks and Distributed Processing
Credits 3. 3 Lecture Hours.
Basic hardware/software, architectural components for computer communications; computer networks, switching, routing, protocols and security; multiprocessing and distributed processing; interfacing operating systems and networks; case studies of existing networks and network architectures.
Prerequisite: CSCE 313 or approval of instructor.

CSCE 464 Wireless and Mobile Systems
Credits 3. 3 Lecture Hours.
Introduction to wireless and mobile systems; wireless communication fundamentals; wireless medium access control design; transmission scheduling, network and transport protocols over wireless design, simulation and evaluation; wireless capacity; telecommunication systems; vehicular, adhoc, and sensor network systems; wireless security; mobile applications.
Prerequisites: CSCE 313; junior or senior classification or approval of instructor.

CSCE 465 Computer and Network Security
Credits 3. 3 Lecture Hours.
Fundamental concepts and principles of computer security, operating system and network security, secret key and public key cryptographic algorithms, hash functions, authentication, firewalls and intrusion detection systems, IPSec and VPN, wireless and web security.
Prerequisites: CSCE 313 and CSCE 315; junior or senior classification; or approval of instructor.

CSCE 469 Advanced Computer Architecture
Credits 3. 3 Lecture Hours.
Introduction to advanced computer architectures including memory designs, pipeline techniques, and parallel structures such as vector computers and multiprocessors.
Prerequisite: ECEN 350/CSCE 350.

CSCE 470 Information Storage and Retrieval
Credits 3. 3 Lecture Hours.
Representation of, storage of and access to very large multimedia document collections; fundamental data structures and algorithms of current information storage and retrieval systems and relates various techniques to design and evaluation of complete retrieval systems.
Prerequisite: CSCE 315 or approval of instructor.

CSCE 481 Seminar
Credit 1. 2 Lab Hours.
Investigation and report by students on topics of current interest in computer science.
Prerequisite: Junior or senior classification.

CSCE 482 Senior Capstone Design
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Project-based course to develop system integration skills for solving real-world problems in computer science; significant team software project that integrates advanced concepts across computer science specializations; projects require design, implementation, documentation and demonstration, as well as design methodology, management process and teamwork.
Prerequisites: Senior classification; CSCE 315, CSCE 411, and two additional CSCE tracked courses.

CSCE 483 Computer Systems Design
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Engineering design; working as a design-team member, conceptual design methodology, design evaluations, total project planning and management techniques, design optimization, systems manufacturing costs considerations; emphasis placed upon students’ activities as design professionals.
Prerequisites: CSCE 315 and CSCE 462; senior classification.

CSCE 485 Directed Studies
Credits 0 to 6. 0 to 6 Other Hours.
Permits work on special project in computer science. Project must be approved by the department.
Prerequisite: Senior classification.
CSCE 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Special topics in computer science that are new or unique that are not covered in existing courses.

CSCE 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in computer science. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

CVEN - Civil Engineering (CVEN)

CVEN 207 Introduction to the Civil Engineering Profession
Credit 1. 1 Lecture Hour.
Introduction to the study and practice of civil engineering; specialized subdisciplines of civil engineering; professionalism and professional registration; engineering ethics; exercises in engineering technical communications.
Prerequisite: ENGL 104.

CVEN 221 Engineering Mechanics: Statics
Credits 3. 2 Lecture Hours. 2 Lab Hours.
General principles of mechanics; concurrent force systems; statics of particles; equivalent force/moment systems; centroids and center of gravity; equilibrium of rigid bodies; trusses, frames, and machines; internal forces in structural members; friction; second moments of areas.
Prerequisites: MATH 251 or MATH 253 or registration therein; PHYS 218; admitted to major degree sequence in civil engineering.

CVEN 250 Introduction to Graphics and Visualization Applications in Civil Engineering Design
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Graphical communication in the civil engineering design process; introduction to industry standard software; construction documents and contract drawings in civil engineering applications; data analysis; introduction to project visualization.

CVEN 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of civil engineering. May be repeated for credit.
Prerequisite: Approval of department head.

CVEN 301 Environmental Engineering
Credits 3. 3 Lecture Hours.
Water quality; material balances; chemical, physical and biological processes; water quality modeling; water and wastewater treatment; air quality; solid and hazardous waste management.
Prerequisites: CHEM 107; CVEN 302 or registration therein; MATH 308 or registration therein.

CVEN 302 Computer Applications in Engineering and Construction
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Application of computers to solution of civil engineering problems using various numerical methods; structured computer programming; mathematical modeling and error analysis; solution of algebraic and differential equations; numerical differentiation and integration; curve-fitting; root-finding.
Prerequisites: ENGR 112; MATH 308 or registration therein; admitted to major degree sequence in civil engineering.

CVEN 303 Civil Engineering Measurement
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to geodetic positions, datums, map projections; theory of civil engineering measurements and errors applied to horizontal and vertical control, curves, earthwork and mapping using state-of-the-art technology for data capture; processing and presentation of result.
Prerequisite: MATH 151; admitted to major degree sequence in civil engineering.

CVEN 304 Environmental and Water Resources Engineering Lab
Credit 1. 3 Lab Hours.
Environmental measurements on physical, chemical, biological and biotechnological parameters of water.
Prerequisites: CVEN 301 or CVEN 301, or concurrent enrollment; CVEN 311 or concurrent enrollment; or approval of instructor.
Cross Listing: EVEN 304.

CVEN 305 Mechanics of Materials
Credits 3. 3 Lecture Hours.
Application of conservation principles and stress/deformation relationships for continuous media to structural members; axially loaded members; thin-walled pressure vessels; torsional and flexural members; shear; moment; deflection of members; combined loadings; stability of columns; nonsymmetrical bending; shear center; indeterminate members; elastic foundations.
Prerequisites: Grade of C or better in CVEN 221, MEEN 221 or MEEN 225.

CVEN 306 Materials Engineering for Civil Engineers
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduction to scientific concepts of civil engineering materials; relationship between macroscopic material properties and response and microscopic properties; physical, mechanical, surface, fracture, and rheological properties of civil engineering materials including metals, composites, and polymers.
Prerequisites: CHEM 107, PHYS 208, CVEN 221, MATH 308 or registration therein; CVEN 305 or registration therein.

CVEN 307 Transportation Engineering
Credits 3. 3 Lecture Hours.
Fundamental principles and methods in planning, design, and operation of transportation systems; driver and vehicle performance capabilities; highway geometric and pavement design principles; traffic analysis and transportation planning.
Prerequisite: CVEN 302 or registration therein.

CVEN 311 Fluid Dynamics
Credits 3. 3 Lecture Hours.
Fluid properties; statics; kinematics; basic conservation principles of continuity, energy and momentum; similitude and hydraulic models; incompressible flow in pipes; fluid dynamic drag.
Prerequisites: MATH 251 and CVEN 221; CVEN 302 or registration therein.

CVEN 315 Sensor Technology for the Built Environment
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Fundamentals of sensor technology including laboratory safety, error analysis, statistical analysis, electric circuits, data acquisition, signal conditioning, signal analysis, strain gages, laser technology, image acquisition and analysis, fiber optic sensors, wireless sensors; its applications in civil engineering; and hands-on demonstrations relevant to the natural and built environment.
Prerequisites: CVEN 302, junior or senior classification, or approval of instructor.
CVEN 322 Civil Engineering Systems
Credits 3. 3 Lecture Hours.
Economic analysis and evaluation of engineering projects; application of systems analysis to civil engineering design; systems synthesis and optimization techniques; assignments apply engineering economics, statistical methods and optimization techniques to civil engineering problems.
Prerequisite: STAT 211 or registration therein; CVEN 302 or registration therein; admitted to major degree sequence in civil engineering.

CVEN 336 Fluid Dynamics Laboratory
Credit 1. 2 Lab Hours.
Introduction to laboratory techniques; calibration principles, reports and fluid measurements; determination of fluid properties; visualization of types of flow; experiments in closed conduit flow of air, water and oil; fluid drag and turbomachinery tests; open channel and gravity wave demonstrations.
Prerequisites: CVEN 311 or registration therein. Enrollment in MASE major degree sequence. Junior or senior classification or approval of instructor.

CVEN 339 Water Resources Engineering
Credits 3. 3 Lecture Hours.
Quantitative hydrology, precipitation, hydrograph analysis, reservoir and stream routing; groundwater; Darcy equation, well equation, well design; probability concepts in design; water law; dams; reservoirs; spillways; open channel and pipe network hydraulics; pumps; urban stormwater drainage; flood damage mitigation.
Prerequisite: CVEN 311.

CVEN 342 Materials of Construction
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Physical and mechanical properties of construction materials; portland cement concrete, bituminous materials, wood, ferrous and non-ferrous metals, glass, plastics and masonry units; proportioning of concrete mixtures including admixtures.
Prerequisites: CVEN 302 or registration therein; CVEN 305 and CVEN 306; ENGL 203, ENGL 210, ENGL 241 or ENGL 301.

CVEN 343 Portland Cement Concrete Materials for Civil Engineers
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Physical and chemical characteristics of Portland cement concrete systems; constituent materials; mixture proportioning; fresh concrete characteristics; hardened concrete properties; durability characteristics; and concrete construction methods.
Prerequisites: CVEN 302 or registration therein; CVEN 305 and CVEN 306; ENGL 203, ENGL 210, ENGL 241 or ENGL 301.

CVEN 345 Theory of Structures
Credits 3. 3 Lecture Hours.
Structural engineering--functions of structure, design loads, reactions and force systems; analysis of statically determinate structures including beams, trusses and arches; energy methods of determining deflections of structures; influence lines and criteria for moving loads; analysis of statically indeterminate structures including continuous beams and frames.
Prerequisites: CVEN 302 or registration therein; CVEN 305.

CVEN 349 Civil Engineering Project Management
Credits 3. 3 Lecture Hours.
Basic elements of management of civil engineering projects; roles of all participants in the process--owners, designers, contractors and suppliers; emphasis on contractual aspect of the process--project estimating, planning and controls.
Prerequisite: CVEN 302 and CVEN 322, or concurrent enrollment.

CVEN 363 Engineering Mechanics: Dynamics
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of first principles to model dynamic particles and rigid body systems with ordinary differential equations; solutions to models using analytical and numerical approaches; interpreting solutions/performance measures; linear vibrations; modeling of civil engineering systems and evaluating dynamic response to natural hazards.
Prerequisites: CVEN 302, CVEN 305 and MATH 308.

CVEN 365 Introduction to Geotechnical Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Physical properties of soils, classification systems, soil exploration, permeability, consolidation, compaction, and shear strength; laboratory tests conducted to determine the physical and engineering soil properties needed for application in geotechnical engineering design.
Prerequisites: CVEN 302 or registration therein; CVEN 305; ENGL 203, ENGL 210, ENGL 241 or ENGL 301.

CVEN 399 Mid-Curriculum Professional Development
Credits 0. 0 Lecture Hours. 0 Lab Hours. 0 Other Hours.
No Credit. Participation in an approved high-impact learning practice; reflection on professional outcomes from civil engineering body of knowledge; documentation of experience appropriate to eventual professional licensure; self-assessment of learning at mid-curriculum point.
Prerequisites: CVEN 207, CVEN 250, CVEN 303, CVEN 306, CVEN 311, CVEN 322, CVEN 345 and CVEN 363.

CVEN 400 Design Problems in Civil Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Applications of civil engineering principles to the design and preparation of the plans and specifications of civil engineering projects.
Prerequisites: CVEN 303, CVEN 322, CVEN 345 and CVEN 399; senior classification; or approval of instructor.

CVEN 402 Engineered Environmental Systems
Credits 3. 3 Lecture Hours.
Unit operations and processes in environmental engineering; physical, chemical and biological treatment of water and wastewater; treatment system analysis and design.
Prerequisite: CVEN 301.

CVEN 403 Applied Civil Engineering Surveying
Credits 2. 6 Lab Hours.
Application of land surveying principles; topographic surveying, boundary surveying, and construction staking through field exercises using state-of-the-art equipment and data capture/analysis techniques; preparation of topographic and boundary maps with related documents; presentation of results.
Prerequisites: CVEN 303; junior or senior classification.

CVEN 405 Construction Management of Field Operations
Credits 3. 3 Lecture Hours.
Effects of industrialization on construction methods and resultant construction management problems.
Prerequisite: CVEN 349.

CVEN 406 Environmental Protection and Public Health
Credits 3. 3 Lecture Hours.
Communicable and noncommunicable diseases; environmental risk assessment; environmental assessments; comprehensive environmental planning; small water and wastewater systems; solid waste management; hazardous spills and waste management; vector control; environmental administration.
Prerequisite: CVEN 301 or approval of instructor.
CVEN 413 Natural Environmental Systems
Credits 3. 3 Lecture Hours.
Water quality assessment of natural environmental systems; development and calibration of models to describe fate and transport of contaminants in aquatic systems; application of models to design of water quality control facilities.
Prerequisite: CVEN 301.

CVEN 417 Bituminous Materials
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Origin, production, specifications and tests of bituminous materials and paving mixtures used in construction and maintenance of roads and pavements, pavement surface properties, pavement distress and correction alternatives.
Prerequisites: Senior classification in engineering; CVEN 342 or CVEN 343 or approval of instructor.

CVEN 418 Highway Materials and Pavement Design
Credits 3. 3 Lecture Hours.
Theory and practice in pavement design; pavement performance; structural design of pavement layers; types of materials used in pavement layers; characterization of pavement layer materials; introduction to pavement management concepts.
Prerequisites: CVEN 307; CVEN 342 or CVEN 343.

CVEN 423 Geomatics for Civil Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Use of GIS, GPS, Survey and Remotely-sensed data integrated with predictive models for infrastructure management systems.
Prerequisite: CVEN 303 or approval of instructor.

CVEN 424 Civil Engineering Professional Practice
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Professional practice issues; current civil engineering issues that impact design, construction, and operation of the civil engineer facilities; developing engineering solutions that better serve society; business and public policy concerns; life-long learning; problem solving; professional licensure.
Prerequisites: CVEN 322 and CVEN 399; senior classification in civil engineering.

CVEN 435 Geotechnical Engineering Design
Credits 3. 2 Lecture Hours. 3 Lab Hours.
A design course covering prediction of settlement, analysis of the stability of slopes, prediction of bearing capacity of shallow and deep foundations and determination of earth pressures acting on retaining structures; a general course in geotechnical engineering design for undergraduates and for graduate students not primarily interested in the geotechnical field, but desiring additional study beyond the introductory undergraduate level.
Prerequisite: CVEN 365.

CVEN 436 Case Histories in Geotechnical Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Examination of geotechnical problems through the use of case studies associated with foundations, waste disposal, slope stability, retaining structures, soil improvement and other civil engineering works.
Prerequisite: CVEN 365.

CVEN 444 Structural Concrete Design
Credits 3. 3 Lecture Hours.
Behavior, design, and detailing of reinforced concrete structural members according to the ACI Building Code Requirements; design for ultimate limit states (flexible, shear, and axial loads) and serviceability requirements (cracking and deflection); applications include continuous beams and moment frames.
Prerequisites: CVEN 345; CVEN 342 or CVEN 343 or registration therein.

CVEN 445 Matrix Methods of Structural Analysis
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Analysis of framed structures using linear algebra concepts; matrix algebra and solution of linear algebraic equations; energy principles and virtual work; stiffness; coordinate transformations; use of commercial software for structural analysis.
Prerequisites: Grade of C or better in CVEN 345 and CVEN 363.

CVEN 446 Structural Steel Design
Credits 3. 3 Lecture Hours.
Design of structural steel elements found in building structures, including tension members, compression members, beams, beam-columns and base plates; design of bolted and welded simple connections; design of bolted eccentric connections; design of bolted and welded partially and fully restrained connections.
Prerequisite: CVEN 345.

CVEN 450 AutoCAD in Civil Engineering
Credit 1. 3 Lab Hours.
CVEN 450. AutoCAD in Civil Engineering. Review and application of basic commands and operations in AutoCAD; overview of civil engineering design projects and land surveying; use of AutoCAD Civil 3D or proprietary packages for reduction of land surveying data.
Prerequisites: CVEN 250 or ENDG 105; junior or senior classification.

CVEN 451 Public Works Engineering
Credits 3. 3 Lecture Hours.
Public works engineering; service demand estimates; water, wastewater and solid waste collection systems; urban drainage; code enforcement and public decision making.
Prerequisites: CVEN 301 and CVEN 339.

CVEN 454 Urban Planning for Engineers
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Urban planning from an engineering point of view; determinants of land use patterns, planning data collection and analysis; location and design requirements for various land uses; interrelationship of transportation and land use; and methods of plan development.
Prerequisite: CVEN 307.

CVEN 455 Urban Stormwater Management
Credits 3. 3 Lecture Hours.
Hydrologic, hydraulic, and general civil engineering design and implementation of stormwater systems including drainage and detention storage facilities, floodplain regulation measures, and flood control structures; stormwater aspects of land development and public works engineering; flood hydrology and hydraulics; institutional aspects of urban stormwater management.
Prerequisite: CVEN 339 or approval of instructor.

CVEN 456 Highway Design
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Theory and practice in highway design; highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, pavement, intersections and highway drainage elements.
Prerequisites: CVEN 307 and CVEN 399; senior classification; or approval of instructor.
CVEN 457 Urban Traffic Facilities  
Credits 3. 3 Lecture Hours.  
Driver, vehicle and roadway characteristics related to design and operation of traffic facilities; selection and design of traffic control devices and information systems for streets and highways; accident analysis and tort liability related to traffic engineering.  
Prerequisite: CVEN 307.

CVEN 458 Hydraulic Engineering of Water Distribution Systems  
Credits 3. 3 Lecture Hours.  
Pressure conduit hydraulics; design, modeling, and analysis of water conveyance and distribution systems including pipelines, pipe networks, and pumps.  
Prerequisite: CVEN 339 or approval of instructor.

CVEN 462 Engineering Hydrogeology  
Credits 3. 3 Lecture Hours.  
Groundwater in the hydrologic cycle; aquifer properties; well hydraulics, testing, and design; groundwater quality; and groundwater management and sustainability.  
Prerequisites: CVEN 311; CVEN 301 or CVEN 339; junior or senior classification; or approval of instructor.

CVEN 463 Engineering Hydrology  
Credits 3. 3 Lecture Hours.  
Occurrence, distribution and properties of natural waters of the earth; measurement and engineering analysis of hydrologic phenomena including precipitation, streamflow and groundwater; hydrologic design of water resources development and management projects.  
Prerequisite: CVEN 339.

CVEN 473 Engineering Project Estimating and Planning  
Credits 3. 3 Lecture Hours.  
Application of cost estimating and planning techniques for civil engineering projects; introduction to labor, materials and equipment costing; productivity analysis; indirect and general overhead costs; preparation of approximate and definitive estimates; and integration of time/cost relationships through critical path method and resource leveling.  
Prerequisites: CVEN 349; senior classification.

CVEN 475 Analysis and Design of Structures  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Overall procedure of analysis and design including functions, loads, layouts of force systems; analysis, specifications, cost comparisons, and maintenance as applied to typical building structures.  
Prerequisites: CVEN 365 or concurrent enrollment; CVEN 399, CVEN 444 and CVEN 446; senior classification; or approval of instructor.

CVEN 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Research and design problems of limited scope approved on an individual basis intended to promote independent study; results of study presented in writing.  
Prerequisite: Approval of department head.

CVEN 489 Special Topics in...  
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of civil engineering. May be repeated for credit.  
Prerequisite: Approval of department head.

CVEN 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty members in civil engineering. May be taken three times for credit.  
Prerequisites: Junior or senior classification and approval of instructor.

DASC - Dairy Science (DASC)  

DASC 202 Dairying  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
(AGRI 1311) Dairying. Survey of dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, physiology and health maintenance; food value of milk, tests for composition and quality, use and processing of market milk and dairy products.

DASC 312/FSTC 312 Food Chemistry  
Credits 3. 3 Lecture Hours.  
The fundamental and relevant chemistry and functionality of the major food constituents (water, carbohydrates, lipids, proteins, phytochemical nutraceuticals) and study of food emulsion systems, acids, enzymes, gels, colors, flavors and toxins.  
Prerequisite: CHEM 227; CHEM 237 or approval of department head or instructor.  
Cross Listing: FSTC 312/DASC 312.

DASC 313/FSTC 313 Food Chemistry Laboratory  
Credit 1. 3 Lab Hours.  
Laboratory exercises investigating specific molecules, such as food acids, enzymes, pigments and flavors, and chemical interactions in foods, such as oxidation reactions, emulsion systems, and functional properties from a fundamental chemistry rather than an analytical perspective.  
Prerequisite: CHEM 227; CHEM 237 or approval of department head or instructor.  
Cross Listing: FSTC 313/DASC 313.

DASC 314/FSTC 314 Food Analysis  
Credits 3. 1 Lecture Hour. 4 Lab Hours.  
Selected standard methods for assay of food components; principles and methodology of both classical and instrumental techniques for food analysis.  
Prerequisite: CHEM 238 or CHEM 242.  
Cross Listing: FSTC 314/DASC 314.

DASC 326/FSTC 326 Food Bacteriology  
Credits 3. 3 Lecture Hours.  
Microbiology of human foods and accessory substances; raw and processed foods; physical, chemical and biological phases of spoilage; standard industry techniques of inspection and control.  
Prerequisites: BIOL 206 or approval of instructor; junior or senior classification.  
Cross Listing: FSTC 326/DASC 326.

DASC 327/FSTC 327 Food Bacteriology Lab  
Credit 1. 3 Lab Hours.  
Laboratory to accompany DASC 326/FSTC 326.  
Cross Listing: FSTC 327/DASC 327.
DASC 400 Animal Science Industry Studies  
Credits 1 to 3. 1 to 3 Other Hours.  
Organized instruction based on well-planned visits to selected industry operations which produce, process or market animal and dairy products, or produce and market supplies and materials to support animal industries; acquaint students with such operations, to reinforce campus-based instruction and to acquaint prospective employers with Texas A&M students. Field trips will normally be made during holidays or between sessions for which departmental fees may be assessed to cover costs.  
Prerequisites: Junior or senior classification; approval of instructor organizing study tour; 2.0 GPR in major and overall.

DASC 418 Feeding and Management of Dairy Cattle  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Dairy farm management; feeding and care of the dairy herd; raising calves for dairy replacements and for beef; developing dairy heifers; care of dry and fresh cows; optimum return rations for milk production; disease control; forage handling and storage; buildings and related topics.  
Prerequisites: ANSC 318; DASC 202; DASC 400 also to be taken concurrently or approval of instructor.

DASC 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Special problems in dairy production or dairy manufacturing.  
Prerequisites: Junior or senior classification; written approval of professor supervising the activity; 2.0 GPR in major and overall.

**DCED - Dance Education (DCED)**

**DCED 160 Ballet I**  
Credits 2. 0 Lecture Hours. 5 Lab Hours.  
(DANC 1241) Ballet I. Introduction to ballet technique for dancers; series of barre exercises progressing to center work, explanation of positions of the body and port de bras; understand proper body alignment as it relates to ballet technique; appreciation of ballet as an instrument of expression. May be taken 3 times for credit.  
Prerequisites: Dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 161 Ballet II**  
Credits 2. 5 Lab Hours.  
Intermediate study of ballet; historical background and the knowledge and understanding of its cultural heritage; increased level of difficulty in barre, center and across the floor; concentration and continual refinement of body/spatial awareness, musicality, alignment and execution of correct classical technique. May be taken 3 times for credit.  
Prerequisite: DCED 160; dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 162 Ballet III**  
Credits 2. 5 Lab Hours.  
Technical study of classical and contemporary ballet; elevated barre work, traditional components including turns, footprint, adagios, advanced center/floor phrases; study of Cecchetti, Vaganova, and collaborative methods; focus on strength, concentration and correct technique on performance combinations. May be taken 3 times for credit.  
Prerequisite: DCED 161; dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 168 Visual and Performing Arts--Jazz Dance III**  
Credits 2. 4 Lab Hours.  
Advanced study of jazz dance; reviews historical background and cultural heritage including significant jazz artists and their influence on jazz dance and society; increased development of coordination, endurance and flexibility necessary to performing extensive jazz combinations; placement exam required on the second day of class.  
Prerequisite: KINE 167 or approval of instructor.

**DCED 171 Modern Dance I**  
Credits 2. 0 Lecture Hours. 5 Lab Hours.  
Study and understanding of modern dance concepts; lateral curve, contraction, spiral, high curve, high release, rotation versus parallel, body alignment, moving in and out of the floor, fluidity of phrase work, musicality and kinesthetic awareness. May be taken 3 times for credit.  
Prerequisites: Dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 172 Modern Dance II**  
Credits 2. 5 Lab Hours.  
Intermediate study of modern dance; reviews, historical background and its development within society; continual study and understanding of modern dance concepts; fall/recovery, contract/release, use of breath and weight, spine work, inversion and spatial awareness. May be taken 3 times for credit.  
Prerequisite: DCED 171; dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 173 Modern Dance III**  
Credits 2. 5 Lab Hours.  
Physical and artistic exploration of both traditional and contemporary training methods; three dimensional spine work, inversion, floor work and dynamics. May be taken 3 times for credit.  
Prerequisite: DCED 172; dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 202 Dance Appreciation**  
Credits 3. 3 Lecture Hours.  
Survey of dance as a cultural and artistic form in numerous countries; exploration of the development and influence of dance in various cultures; analysis of various genres of artistic dance and their development; discussion of aesthetic principles of dance as an art form and how choreographers are influenced by society to create work.

**DCED 203 Dance Production**  
Credits 3. 3 Lecture Hours.  
Overview of philosophy, major aspects and common elements in producing dance concerts; lighting, sound, stage design, terminology, costuming, management, production designs, practical experience with on-stage performances.  
Prerequisites: Dance science majors, dance concentration majors and dance minors; or approval of instructor.

**DCED 301 Dance History**  
Credits 3. 3 Lecture Hours.  
Overview of current dance scene, career fields, education; development of theatrical, social, educational dance from lineage based to contemporary cultures; emphasis on dance in America, genres, roots, heritage, pioneers, crusading artists; impacts, influences, growth, development, trends and continual metamorphosis in the art world.  
Prerequisite: Approval of instructor.
DCED 303 Health Practices for Dancers
Credits 2. 2 Lecture Hours.
Focuses on health issues common to the dancer such as overtraining, drug use and performance anxiety, anatomy in relation to proper dance technique, misalignments, imbalances and injuries common to the dancer.
Prerequisites: Dance science majors only or approval of instructor; junior or senior classification.

DCED 304 Creative Dance for Children
Credits 3. 3 Lecture Hours.
Theory and practice of creative movement classes for children; the development stages and learning outcomes of creative movement; incorporation of creative movement into children's classes; dance elements and benefits of creative movement; lesson plans and student assessment.
Prerequisite: Junior or senior classification or approval of instructor.

DCED 306 Dance Composition I
Credits 2. 2 Lecture Hours.
Introduces choreographic devices in solo and duet movement studies; exploration of design principles; creating multiple movement studies using various elements of choreography.
Prerequisites: Dance science majors, dance concentration majors and dance minors; or approval of instructor; junior or senior classification.

DCED 400 Dance Composition II
Credits 2. 2 Lecture Hours.
Introduces choreographic devices related to group movement studies; explore and create movement studies as a means of first and second function art, use choreographic tools in the dance making process as it relates to group work.
Prerequisites: DCED 306 or approval of instructor.

DCED 401 Dance Pedagogy
Credits 3. 3 Lecture Hours.
Study of dance pedagogy; major aspects of a dance teacher including knowledge of injury prevention, correct technique, preparation, presentation, evaluation of dance materials, levels and technique class; focus on various teaching methods, tools, planning, communication/instructional skills and learning experiences/styles.
Prerequisites: DCED 301 and DCED 400 or approval of instructor; junior or senior classification.

DCED 402 Dance Composition III
Credits 2. 2 Lecture Hours.
Choreograph, design and produce a senior concert; accumulation of previous course work in composition should be used to bring the elements of the choreographic process to a final product.
Prerequisites: DCED 400; dance science track majors only; admittance into the professional phase or approval of instructor; junior or senior classification.

DDDS 011 Anterior Composites and Esthetics
Credits 0.
Advanced concepts including diagnosis, preparation and restoration of anterior teeth utilizing composite materials.

DDDS 012 Forensic Dentistry
Credits 0. 1 Lab Hour.
This summer semester course will introduce students to the Science of Forensic Dentistry, providing a broad overview of its scope but emphasizing forensic dental identification of deceased individuals. Identification procedures, particularly as they pertain to mass casualty situations, will be stressed. Twelve hours of hands-on laboratory participation in mock mass casualty exercises will allow students to utilize the knowledge they have gained and sharpen identification skills. This selective does not require clinic, but does require 12 hours of lab. Class time and location to be announced by course director. Class is limited to 35 D4 students only.

DDDS 013 Orthodontic Clinical Selective
Credits 0.
This is a clinical selective course in which D4 students will provide limited (adjunctive) orthodontic treatment to patients as one component of a comprehensive treatment plan. This treatment will be provided in conjunction with a third year orthodontic resident, and under the supervision of an orthodontic department faculty member.

DDDS 014 Advanced Implant Dentistry – Case Analysis and Problem Based Approach
Credits 0.
This course is designed for senior dental students who are interested in gaining advanced knowledge of implant dentistry. This course will give students advanced knowledge of implant supported restorations and their application in clinical dentistry. The course will include the evolution of implant dentistry, an interactive case-based session on treatment planning and case analysis, CAD-CAM technologies in implant dentistry, cone beam tomography, 3D treatment planning systems and digitally guided surgeries. Additionally, it will cover advanced implant treatment options (One on Four, Zygomatic Implants, Bioadaptable Implants...etc). The students will also be exposed to a wide variety of implant systems allowing them the chance to compare the most commonly distributed implant systems and their characteristics and applications. It will also include implants in the esthetic zone, implant complications, prevention and troubleshooting and the future direction of implant dentistry.

DDDS 015 Interdisciplinary C.A.R.E. and Collaboration
Credits 0.
This spring semester course will provide an opportunity for D-3 students to become more proficient at evaluating and integrating emerging trends in clinical care and identifying factors that differentiate one case from another. Clinical examples of interdisciplinary cases will be presented by post-doctoral residents that highlight a specific discipline (including contributions of other disciplines when appropriate). Both conventional and unconventional treatment methods will be presented.

DDDS 017 Advanced Topics in Endodontics
Credits 0. 1 Lab Hour.
Advanced information and training in current endodontic topics including some of the state-of-the-art equipment used by endodontists today; discussion of complex diagnostic cases, advanced cleaning and shaping techniques (new rotary instrumentation systems), advanced obturation techniques (warm vertical gutta-percha), notions of the utilization of an endodontic surgical microscope and endodontic retreatment; does not require clinic but does require 2 hours of lab; class time and location announced by course director; participation by invitation only.
DDDS 018 Orthodontic Externship
Credits 0. 1 Other Hour.
The seminar portion of the course provides the students with an opportunity to enhance their skills in the diagnosis and recognition of malocclusion and craniofacial anomalies, and the ramifications of these diagnoses in the development of comprehensive treatment plans. Faculty will provide examples of new cutting edge technologies that are rapidly changing the approach to treatment of orthodontic patients. The externship provides an opportunity to discuss management considerations and other issues involved in the operation of a specialty practice. This selective does not require clinic. Class time and location to be announced by course director. Class is limited to 10 D4 students only.

DDDS 019 Fabrication of Complete Dentures Utilizing CAD/CAM Technology
Credit 1. 1 Lab Hour.
The focus of this selective is the fabrication of complete dentures by CAD/CAM digital technology. In this process, the number of patient visits can be reduced, eliminating some traditional laboratory steps.

DDDS 024 Externship in Pediatric Dentistry
Credits 0.
This summer course introduces the student to the Advanced Education Program in Pediatric Dentistry; the delivery of dental care to medically and mentally compromised children and the delivery of dental care to children under various forms of sedation and general anesthesia. Participation in this selective course is by invitation only. Class is limited to 5 D4 students.

DDDS 025 Dental Ceramics
Credits 0.
This summer semester course introduces theory and fabrication of ceramo-metal and all-ceramic prosthodontic restorations. This selective does not require clinic, but does require 25 hours of lab. Class time and location to be announced by course director. Participation in this selective is by invitation only and restricted to D4 students.

DDDS 034 Dental Implantology
Credits 0. 1 Other Hour.
A clinical (treatment of patient who received dental implants), laboratory, surgical and restorative exercise. Familiarizes students with patient management of dental implants. This selective does require clinic time. Class time and location to be announced by course director. Class is limited to 12 D4 students per semester.

DDDS 042 Athletic Mouthguards
Credits 0. 1 Lab Hour.
Students attend seminars and fabricate athletic mouth guards for a community athletic team. This selective does not require clinic, but does require 15 hours of lab. The spring and summer course will be held on the 3rd and 6th floors. Class time and location to be announced by course director. Class is limited to 25 D3/D4 students only per semester.

DDDS 043 Tutoring Skills Seminar
Credits 0. 1 Lecture Hour.
This fall semester course will train students nominated by course directors to become effective peer tutors by developing skills in instructional technique. Class time and location to be announced by course director. Class is limited to D3/D4 students only.

DDDS 053 Secrets of Practice Success
Credits 0.
This summer/fall/spring course will teach, strengthen and reinforce behavioral skills that help dental teams build powerful interpersonal relationships with their patients, each other, their families and their communities as well as establish a patient-centered, preventively-oriented approach to practicing dentistry. This class is offered to D4 students.

DDDS 092 Craniofacial Research
Credits 0. 1 Other Hour.
This course is for research participants in the Short Term Training Program only. Provides students with an introduction to dental and craniofacial research and instill recognized values of biomedical research ethics.

DDDS 098 Dental Public Health
Credits 0.
This summer selective course offers observation of oral health care services for at least four days in a private dental office. This selective does not require class participation, is by invitation only and is limited to 50 D4 students.

DDDS 099 Public Health Sciences Community Preceptorship Program
Credits 0. 1 Other Hour.
This summer selective course offers observation of oral health care services for at least four days in private practice, Indian Health Service, Veterans Administration hospital or other public health settings. This selective does not require clinic time. Class time and location to be announced by course director. Class participation is by invitation only and is limited to 30 D4 students.

DDHS - Dental Hygiene (DDHS)

DDHS 3020 Theory of Dental Hygiene Practice I
Credits 2. 2 Lecture Hours.
Emphasis on advanced dental hygiene skills and services; provision of services to medically compromised patients.

DDHS 3110 Introduction To Dentistry
Credit 1. 1 Lecture Hour.
Introduction to dental hygiene as it relates to the dental specialties. Guest lecturers will describe what their specialty encompasses and the dental hygienist’s role in that field of dentistry.

DDHS 3120 Dental Anatomy
Credits 2. 2 Lecture Hours.
Form and function of the primary and permanent human dentition; laboratory and seminar emphasis on morphology and comparisons of teeth.

DDHS 3160 Preclinical Dental Hygiene
Credits 6. 4 Lecture Hours. 0.5 Lab Hours. 8 Other Hours.
This course introduces the student to the foundational knowledge and skills needed to provide basic dental hygiene services. With faculty guidance, the student learns how to assess a patient’s oral health needs, plan dental hygiene services to meet those needs, and implement and evaluate newly learned preventive and therapeutic procedures.

DDHS 3220 Oral Radiology
Credits 0 to 2. 2 Lecture Hours. 1 Lab Hour. 1 Other Hour.
This course is intended to provide the student with an understanding of the generation, properties, and techniques for use of X-rays in dentistry. The principles of radiation safety and health physics, interpretative recognition techniques and clinical patient management.
DDHS 3250 Biomedical Sciences I
Credits 5. 5 Lecture Hours. 0 Lab Hours.
Structure of the human body, including its anatomy, biochemistry, histology and physiology. Emphasis is placed on the structures of the head and neck region that surrounds the oral cavity.

DDHS 3310 Health Education and Behavioral Science
Credit 1. 1 Lecture Hour.
This course is designed to introduce the student to health education and behavioral science as it relates to educating patients and changing behaviors. Students will gain knowledge in evaluating and delivering educational services to culturally diverse populations.

DDHS 3325 Microbiology
Credits 2.5. 2.5 Lecture Hours. 0 Lab Hours.
A lecture course designed to teach the basic principles of medical microbiology, immunology and the infectious disease process.

DDHS 3340 Biomedical Sciences II
Credits 4. 4 Lecture Hours. 0 Lab Hours.
Structure of the human body, including its anatomy, bio-chemistry, histology and physiology. Emphasis is placed on the structures of the head and neck region that surrounds the oral cavity.

DDHS 3410 Introduction to Pathology
Credit 1. 1 Lecture Hour.
Introduction to Pathology is primarily a didactic lecture oriented course. Although clinically oriented, it is designed to provide a base of knowledge about pathologic processes and specific disease entities. Emphasis is on concepts and vocabulary essential to understanding basic pathologic process; systemic pathology of organ systems and tissues; clinical manifestations that result from biological cellular alterations.

DDHS 3425 Health Promotion and Disease Prevention
Credits 2.5. 2.5 Lecture Hours.
This course introduces the student to the etiology and prevalence of oral diseases and oral problems. The emphasis of the course is on the role of the dental hygienist in the promotion of optimal oral health, the prevention of oral diseases, and the importance of achieving and maintaining excellent personal oral health habits. The importance of and the techniques for educating the patient in self-care skills will also be examined.

DDHS 3530 Applied Dental Materials
Credits 3. 2 Lecture Hours. 2.5 Lab Hours.
Didactic, laboratory and clinical instruction in the principles of the science of dental materials and in procedures within the scope of dental hygiene practice.

DDHS 3830 Clinical Dental Hygiene I
Credits 3. 9 Other Hours.
Comprehensive dental hygiene care through clinical application of procedures. Includes intramural dental hygiene and dental school rotations.

DDHS 4010 National Board Review
Credit 1. 1 Lecture Hour.
Reviews applications of previous course content using a seminar format in preparation for the National Board Dental Hygiene Exam.

DDHS 4015 Pharmacology
Credit 1.5. 1.5 Lecture Hour.
Actions, indications and contraindications of drugs; emphasis on drugs frequently encountered in dentistry.

DDHS 4025 Oral Pathology
Credits 2.5. 2.5 Lecture Hours.
A didactic lecture oriented course. The lecture portion of the course, although, clinically oriented is designed to provide a base of knowledge about pathologic processes and specific disease entities. Diseases unique to the oral regions as well as oral manifestations of systemic disease will be covered. The Clinical Pathologic Conference (CPC) attempts to assimilate that information and apply it to relevant clinical situations in a case-based PDL format. Cases which illustrate a variety of clinical signs and symptoms will be presented with clinical histories. Students will be given the opportunity to develop a differential diagnosis and discuss the implications of this relevant to the patient’s treatment.

DDHS 4110 Medical Emergencies
Credits 0-1. 0-1 Lecture Hours.
Discussions on the preparations for handling emergencies; prevention, recognition and management of various emergencies. The course includes case scenario presentations and mock hands-on drills.

DDHS 4140 Clinical Dental Hygiene III
Credits 4. 12 Other Hours.
Comprehensive dental hygiene care through clinical application of procedures. Includes intramural dental hygiene and dental school rotations and extramural site rotations.

DDHS 4210 Professional Ethics
Credit 1. 1 Lecture Hour.
The didactic lecture course and case-based small group decision making exercises draw from general ethics, bioethics, dental-specific ethics and obligations of health-care professionals.

DDHS 4220 Comprehensive Care Seminar
Credits 0 to 2. 0 to 2 Lecture Hours.
Topics and activities designed to integrate dental hygiene care with total patient care; includes a case presentation.

DDHS 4240 Clinical Dental Hygiene IV
Credits 4. 12 Other Hours.
Comprehensive dental hygiene care through clinical application of procedures. Includes intramural dental hygiene and dental school rotations and extramural site rotations.

DDHS 4310 Oral Radiography
Credits 0-1. 0-1 Other Hours.
Provides the student with clinical experience in the application of the principles, procedures and techniques of oral radiography.

DDHS 4320 Perspectives in Dental Hygiene
Credits 2. 2 Lecture Hours.
In addition to preparing the student for private practice dental hygiene positions, this course introduces other potential career options including hospital/clinic administration, sales, consulting, public health, insurance and education. The importance of the dental team concept, résumé writing and interviewing skills will be discussed. Legal, ethical and professional issues involving record keeping, licensing, informed consent, sexual harassment and the standard of care will be explored. The business aspects of dental hygiene, personal financial planning, and insurance options will also be addressed. In addition, this course will prepare students for the Texas Jurisprudence Exam required for state licensure.
DDHS 4410 Gerontology  
Credit 1. 1 Lecture Hour.  
This course will examine the unique considerations a dental professional will encounter when providing care to a geriatric patient. Social, psychological and biological aspects of aging will be discussed. Strategies for patient care will be outlined and discussed. Appropriate community referral agencies will be explored to aid the hygienist in providing assistance to the elderly patient.

DDHS 4510 Pediatric Dentistry  
Credit 1. 1 Lecture Hour.  
Child development as the basis for management of behavior in the dental environment.

DDHS 4530 Public and Community Health  
Credits 0 to 3. 0 to 3 Other Hours.  
This course examines dental public health and pro-motes a greater understanding of the important role of the dental hygienist within the community. The student is exposed to opportunities to promote oral health and prevent dental diseases in the community through organized community-based programs versus the traditional clinical approach.

DDHS 4610 Periodontics  
Credit 1. 1 Lecture Hour.  
Characteristics, etiology and treatment of inflammatory diseases of the supporting tissues of the teeth and their substitutes. Emphasis is placed on the relationship of periodontics to the practice of dental hygiene.

DDHS 4620 Theory of Dental Hygiene Practice II  
Credits 2. 2 Lecture Hours.  
Fundamental knowledge and techniques in managing patients with special needs.

DDHS 4710 Applied Research Methods  
Credit 1. 1 Lecture Hour.  
Practical experience in applying principles of research methodology; includes preparation of a formal proposal and table clinic under mentorship of individual faculty.

DDHS 4715 Research Methods  
Credit 1.5. 1.5 Lecture Hour.  
Identification of research problems and variables; sampling; research design; statistical testing of data; critical review of dental literature; table clinic development for presentation to the public and professional groups.

DDHS 4810 Local Anesthesia and Nitrous Oxide/Oxygen Sedation  
Credit 1. 1 Lecture Hour.  
The primary method of presentation is lecture, a detailed outline is provided to each student to facilitate the lecture or textbook notes to supplement the outline. Students are given outside assignments to practice dose calculations for each local anesthetic and for a variety of patients. The lecture material is supplemental with videotapes designed to show the correct administration techniques, the neural innervations of each area of the oral cavity and the area anesthetized.

DDHS 4820 Clinical Dental Hygiene II  
Credits 2. 6 Other Hours.  
Comprehensive dental hygiene care through clinical application of procedures. Includes intramural dental hygiene and dental school rotations and extramural site rotations.

DIVE - Diving Tech and Methods (DIVE)

DIVE 250 SCUBA Diving I  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Fundamental academic knowledge and practical application of SCUBA diving practices and theory; introduction to diving tables and diving physiology.  
Prerequisites: Must complete a medical statement showing no contraindications to diving, or have a recreational SCUBA diver's physical examination.

DIVE 251 SCUBA Diving II  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Methods to promote safe, self-reliant diving and improve the diver's comfort, coordination and strength in the water, to build competency in dive planning and organization.  
Prerequisites: Must complete a medical statement showing no contraindications to diving, or have a recreational SCUBA diver’s physical examination; open water certification from a nationally recognized agency; Divers Alert Network (DAN) insurance or equivalent.

DIVE 330 Rescue Diving  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Relates skills necessary to perform basic life support, administer dive first aid, evacuate victim, assist and rescue other divers in water; illustrate proper dive planning; practice accident prevention and effective accident management.  
Prerequisites: Must complete a medical statement showing no contraindications to diving, or have a recreational SCUBA diver’s physical examination; certification as a SDI SCUBA diver or equivalent; Divers Alert Network (DAN) diving accident insurance or equivalent.

DIVE 331 Alternative Diving Technology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Illustrates the realities of operating in the scientific, public safety and military diving disciplines; practice real world training scenarios involving multiple aspects of each of the three fields.  
Prerequisites: Must complete a medical statement showing no contraindications to diving, or have a recreational SCUBA diver’s physical examination; AAUS physical if rating with AAUS; certification as an Advanced and Rescue Diver or equivalent; Divers Alert Network (DAN) diving accident insurance or equivalent; junior or senior classification or approval of instructor.

DIVE 357 Dive Leadership – Divemaster  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Examines divemaster-level dive knowledge, dive leadership theory and application, presentations skills, physical diving skills, logistics and planning, and operational execution; develops a multi-environment capable diving leader.  
Prerequisites: Must complete a medical statement showing no contraindications to diving, or have a recreational SCUBA diver’s physical examination; certification as a SDI Advanced SCUBA Diver and SDI SCUBA Rescue Diver or equivalent; 60 varied dives logged; current certifications in First Aid, CPR and Emergency Oxygen Administration; Divers Alert Network (DAN) diving accident insurance (or equivalent); junior or senior classification or approval of instructor.
DIVE 457 Dive Leadership – Instructor  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**
Apply effective methods to teach skin and SCUBA diving in compliance with training agency instructional standards; evaluate instructional level dive knowledge, water skills and presentation performance in accordance with training agency teaching standards.  
**Prerequisites:** Recreational SCUBA diver’s medical evaluation; certification as a SCUBA divemaster or equivalent; 100 varied dives logged; current certification in First Aid, CPR and Emergency Oxygen Administration; Divers Alert Network (DAN) diving accident insurance or equivalent; junior or senior classification or approval of instructor.

**ECEN - Electrical & Comp Engr (ECEN)**

**ECEN 214 Electrical Circuit Theory**  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**
Resistive circuits including circuit laws, network reduction, nodal analysis, mesh analysis; energy storage elements; sinusoidal steady state; AC energy systems; magnetically coupled circuits; the ideal transformer; resonance; introduction to computer applications in circuit analysis.  
**Prerequisites:** PHYS 208, CHEM 107 and CHEM 117 with a grade of C or better; MATH 308 with a grade of C or better or concurrent enrollment.  

**ECEN 215 Principles of Electrical Engineering**  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**
Fundamentals of electric circuit analysis and introduction to electronics for engineering majors other than electrical and computer engineering.  
**Prerequisites:** MATH 251 and PHYS 208 with a grade of C or better.

**ECEN 222/CSCE 222 Discrete Structures for Computing**  
**Credits 3. 3 Lecture Hours.**
Provide mathematical foundations from discrete mathematics for analyzing computer algorithms, for both correctness and performance; introduction to models of computation, including finite state machines and Turing machines.  
**Prerequisite:** MATH 151.  
**Cross Listing:** CSCE 222/ECEN 222.

**ECEN 248 Introduction to Digital Systems Design**  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**
Combinational and sequential digital system design techniques; design of practical digital systems.  
**Prerequisite:** MATH 152 and PHYS 208 with a grade of C or better.

**ECEN 285 Directed Studies**  
**Credits 0 to 4. 0 to 4 Other Hours.**
Problems of limited scope approved on an individual basis intended to promote independent study.  
**Prerequisite:** Approval of department head.

**ECEN 289 Special Topics in...**  
**Credits 1 to 4. 1 to 4 Other Hours.**
Selected topics in an identified area of electrical engineering. May be repeated for credit.  
**Prerequisite:** Approval of instructor.

**ECEN 291 Research**  
**Credits 0 to 4. 0 to 4 Other Hours.**
Research conducted under the direction of faculty member in electrical engineering. May be repeated 3 times for credit.  
**Prerequisites:** Freshman or sophomore classification and approval of instructor.

**ECEN 303 Random Signals and Systems**  
**Credits 3. 3 Lecture Hours. 1 Lab Hour.**  
Concepts of probability and random variables necessary for study of signals and systems involving uncertainty; applications to elementary problems in detection, signal processing and communication.  
**Prerequisites:** Grade of C or better in MATH 308; junior or senior classification.

**ECEN 314 Signals and Systems**  
**Credits 3. 3 Lecture Hours. 1 Lab Hour.**
Introduction to the continuous-time and discrete-time signals and systems; time domain characterization of linear time-invariant systems; Fourier analysis; filtering; sampling; modulation techniques for communication systems.  
**Prerequisites:** Grade of C or better in ECEN 214; MATH 308; junior or senior classification.

**ECEN 322 Electric and Magnetic Fields**  
**Credits 3. 3 Lecture Hours. 1 Lab Hour.**
Vector analysis, Maxwell’s equations, wave propagation in unbounded regions, reflection and refraction of waves, transmission line theory; introduction to waveguides and antennas.  
**Prerequisites:** ECEN 214, PHYS 208, and MATH 311 with a grade of C or better; junior or senior classification.

**ECEN 325 Electronics**  
**Credits 4. 3 Lecture Hours. 4 Lab Hours.**
Introduction to electronic systems; linear circuits; operational amplifiers and applications; diodes, field effect transistors, bipolar transistors; amplifiers and nonlinear circuits.  
**Prerequisite:** MATH 311 with a grade of C or better; ECEN 314 with a grade of C or better, or registration therein.

**ECEN 326 Electronic Circuits**  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**
Basic circuits used in electronic systems; differential and multistage amplifiers; output stages and power amplifiers; frequency response, feedback circuits, stability and oscillators, analog integrated circuits, active filters.  
**Prerequisites:** Grade of C or better in ECEN 314 and ECEN 325; junior or senior classification.

**ECEN 333 At the Interface of Engineering and Life Sciences**  
**Credits 3. 3 Lecture Hours.**
Broad overview of electrical and computer engineering principles applied to various areas of life sciences; medical imaging and biomedical signal processing; micro/nano devices and systems; computational biology and genomic signal processing; recent trends in interfacing engineering and life science that address emerging grand challenge problems in health, bio-energy and bio-security; taught in a team approach.  
**Prerequisites:** Junior or senior classification or approval of instructor.

**ECEN 338 Electromechanical Energy Conversion**  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**
Introduction to magnetic circuits, transformers, electromechanical energy conversion devices such as dc; induction and synchronous motors; equivalent circuits, performance characteristics and power electronic control.  
**Prerequisite:** ECEN 214.
ECEN 350/CSCE 350 Computer Architecture and Design
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Computer architecture and design; use of register transfer languages and simulation tools to describe and simulate computer operation; central processing unit organization, microprogramming, input/output and memory system architectures.
Prerequisites: Grade of C or better in ECEN 248; junior or senior classification.

ECEN 370 Electronic Properties of Materials
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Introduction to basic physical properties of solid materials; some solid state physics employed, but major emphasis is on engineering applications based on semiconducting, magnetic, dielectric and superconducting phenomena.
Prerequisite: Grade of C or better in PHYS 222; junior or senior classification.

ECEN 399 High Impact Professional Development
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.
Prerequisites: ECEN 214 and ECEN 248 with a grade of C or better; junior or senior classification or approval of instructor.

ECEN 403 Electrical Design Laboratory I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Application of design process and project engineering as practiced in industry; team approach to the design process; development of a project proposal; proposed project implemented in ECEN 404.
Prerequisites: COMM 205 or COMM 243 or ENGL 210; grade of C or better in ECEN 314, ECEN 325, ECEN 350/CSCE 350; grade of C or better in ECEN 303, ECEN 322, ECEN 370 or grade C or better in CSCE 315, ECEN 449, STAT 211 or ECEN 303; senior classification.

ECEN 404 Electrical Design Laboratory II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Continuation of ECEN 403; application of the design process and project engineering as practiced in industry; team approach to the design process; completion of project based on proposal from ECEN 403; includes testing, evaluation and report writing.
Prerequisites: Grade of C or better in ECEN 403; senior classification.

ECEN 405 Electrical Design Laboratory
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Introduction to the design process and project engineering as practiced in industry; student teams apply the design process by developing a project from proposal through test and evaluation.
Prerequisites: ENGL 210 or 301, completion of selected major field courses, senior classification and project approval.

ECEN 410 Medical Imaging
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Fundamentals of physics and the engineering principles of medical imaging systems; focus on magnetic resonance imaging, x-ray computer tomography, ultrasonography, optical imaging and nuclear medicine; includes systems, sources, energy tissue interaction, image formation and clinical examples; virtual labs, on- and off-campus lab tours.
Prerequisites: Grade of C or better in MATH 222 or MATH 251 or MATH 253; ECEN 444 or grade of C or better in ECEN 314; junior or senior classification.

ECEN 411 Introduction to Magnetic Resonance Imaging and Magnetic Resonance Spectroscopy
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to the basic physics of magnetic resonance, the principles of MR imaging and spectroscopy, the major contrast mechanisms in MRI and MR imaging system hardware; development of pulse sequences for different imaging methods, including flow and spectroscopic imaging; will build RF coils.
Prerequisites: Grade of C or better in MATH 251 and PHYS 208; junior or senior classification.

ECEN 412 Ultrasound Imaging
Credits 3. 3 Lecture Hours.
Mathematical analysis of wave propagation, scattering of ultrasound in biological tissues, electronic transducer arrays for the beam forming, models of the received signals and signal processing methods for medical ultrasound imaging of tissues; includes discussions of research related to fundamental ultrasound imaging concepts.
Prerequisites: Grade of C or better in ECEN 314; junior or senior classification.

ECEN 414 Biosensors
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Hands-on lab experience in the development of miniaturized biosensors; includes microfluidic devices for biosensing.
Prerequisite: Senior classification or approval of instructor.

ECEN 415 Physical and Economical Operations of Sustainable Energy Systems
Credits 3. 3 Lecture Hours.
Operational issues for sustainable electric energy systems; basic relevant topics in engineering, optimization and economic concepts; modular view of individual electric energy processing components; physical and market operations in electricity industry in support of sustainable energy integration; computer simulations and demonstrations to create and evaluate examples of power systems.
Prerequisites: ECEN 420 or ECEN 460; junior or senior classification.

ECEN 419 Genomic Signal Processing
Credits 3. 3 Lecture Hours.
Fundamentals of molecular biology; application of engineering principles to systems biology; topics include unearthing intergene relationships, carrying out genebased classification of disease, modeling genetic regulatory networks, and altering their dynamic behavior.
Prerequisites: Grade of C or better in ECEN 314; junior or senior classification.

ECEN 420 Linear Control Systems
Credits 3. 3 Lecture Hours.
Application of state variable and frequency domain techniques to modeling, analysis and synthesis of single input, single output linear control systems.
Prerequisites: Grade of C or better in ECEN 314 and MATH 308; junior or senior classification.

ECEN 421 Digital Control Systems
Credits 3. 3 Lecture Hours.
Feedback systems in which a digital computer is used to implement the control law; Z-transform and time domain methods serve as a basis for control systems design. Effects of computer word length and sampling rate.
Prerequisite: ECEN 420 or equivalent.
ECEN 422 Control Engineering and Design Methodology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Modeling, specifications, rating and operating principles of sensors, actuators and other control system components; experiments on conceptual design, simulation and physical implementation of control systems.  
Prerequisite: ECEN 420 or equivalent.

ECEN 423 Computer and Wireless Networks  
Credits 3. 3 Lecture Hours.  
Prerequisite: Grade of C or better in MATH 311; junior or senior classification.

ECEN 424 Fundamentals of Networking  
Credits 3. 3 Lecture Hours. 1 Lab Hour.  
Foundations of computer networking; layered architecture of the Internet, analysis of protocols, new-age networks such as the Web and social networks; computer network programming and offline analysis of real network data.  
Prerequisites: Grade of C or better in ECEN 303 or STAT 211; junior or senior classification.

ECEN 425 Radio Frequency and Microwave Engineering  
Credits 3. 3 Lecture Hours.  
Fundamental Radio Frequency (RF) and microwave circuit analysis including scattering and ABCD matrices, return loss, insertion loss; transmission lines, lumped elements, impedance matching; theory, analysis and design of basic RF and microwave passive circuits; use of commercial CAD programs for RF and microwave circuit design and simulation.  
Prerequisites: Grade of C or better in ECEN 322; junior or senior classification.

ECEN 434 Optimization for Electrical and Computer Engineering Applications  
Credits 3. 3 Lecture Hours.  
Principles of optimization including linear and nonlinear optimization as well as electrical and computer engineering applications in signal estimation, routing in communication networks, flows in wireless networks, wafer fabrication plants, and economic dispatch in power systems.  
Prerequisites: Grade of C or better in MATH 304 or MATH 309 or MATH 311; grade of C or better in MATH 251; junior or senior classification.

ECEN 438 Power Electronics  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Electric power conditioning and control; characteristics of solid state power switches; analysis and experiments with AC power controllers, controlled rectifiers, DC choppers and DC-AC converters; applications to power supplies, airborne and spaceborne power systems.  
Prerequisite: Junior or senior classification in electrical engineering or approval of instructor.

ECEN 440 Introduction to Thin Film Science and Technology  
Credits 3. 3 Lecture Hours. 1 Lab Hour.  
The course focuses on the thin film technology in semiconductor industry; topics include the basic growth mechanisms for thin films (growth models, lattice matching epitaxy and domain matching epitaxy), the instrumental aspects of different growth techniques and advanced topics related to various applications.  
Prerequisites: Junior or senior classification.

ECEN 441 Electronic Motor Drives  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Application of semiconductor switching power converters to adjustable speed DC and AC motor drives; steady state theory and analysis of electric motion control in industrial, robotic and traction systems; laboratory experiments in power electronic motor drives and their control.  
Prerequisite: Junior or senior classification in electrical engineering.

ECEN 442 DSP Based Electromechanical Motion Control  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Overview of energy conversion and basic concepts on electromechanical motion devices; different control strategies including the solid-state drive topologies; for every electromechanical motion device, its DSP control implementation discussed and implemented in the lab.  
Prerequisites: Grade of C or better in ECEN 314; junior or senior classification.

ECEN 444 Digital Signal Processing  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Digital signal processing; discrete-time signals and systems, linear shift-invariant systems, the discrete Fourier transform algorithm, and design of finite impulse response and infinite impulse response digital filters.  
Prerequisites: Grade of C or better in ECEN 314; junior or senior classification.

ECEN 445 Applied Electromagnetic Theory  
Credits 3. 3 Lecture Hours.  
Guided wave and wireless methods; applications of Maxwell’s equations and electromagnetic wave phenomena to radiation, antennas and microwave circuit design; digital transmission line analysis and design.  
Prerequisites: Grade of C or better in ECEN 322; junior or senior classification.

ECEN 447 Digital Image Processing  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Improvement of pictorial information using spatial and frequency domain techniques; two-dimensional discrete Fourier transform; image filtering, enhancement, restoration, compression; image processing project.  
Prerequisites: Grade of C or better in ECEN 314; junior or senior classification.

ECEN 448 Real-Time Digital Signal Processing  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Features and architectures of digital signal processing (DSP) chips; fundamental compromises amongst computational accuracy, speed and cost; real-time implementation of filtering, audio, image and video processing algorithms; rapid prototyping via MATLAB/Simulink.  
Prerequisites: ECEN 444; junior or senior classification.
ECEN 449 Microprocessor Systems Design
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduction to microprocessors; 16/32 bit single board computer hardware and software designs; chip select equations for memory board design, serial and parallel I/O interfacing; ROM, static and dynamic RAM circuits for no wait-state design; assembly language programming, stack models, subroutines and I/O processing.
Prerequisites: Grade of C or better in ECEN 248; junior or senior classification.

ECEN 451 Antenna Engineering
Credits 3. 3 Lecture Hours.
Introduction to antenna theory and design; includes antenna performance parameters, analysis of radiation from sources using Maxwell’s equations, theory and design of wire antennas, arrays and frequency independent antennas; computer methods for antenna design.
Prerequisite: Grade of C or better in ECEN 322; junior or senior classification.

ECEN 452 Ultra High Frequency Techniques
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to theory and practice of ultra high frequency wave generation, transmission and radiation; application of Maxwell’s equations to transmission of electrical energy in wave guides.
Prerequisites: ECEN 322 with a grade of C or better; junior or senior classification.

ECEN 453 Microwave Solid-State Circuits and Systems
Credits 3. 3 Lecture Hours.
Microwave solid-state devices and circuits; theory and design of various types of active circuits; applications of these devices and circuits in radar, communication and surveillance systems.
Prerequisites: Grade of C or better in ECEN 322; junior or senior classification.

ECEN 454 Digital Integrated Circuit Design
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Analysis and design of digital devices and integrated circuits using MOS and bipolar technologies and computer aided simulation.
Prerequisites: Grade of C or better in ECEN 214 and ECEN 248; junior or senior classification.

ECEN 455 Digital Communications
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Digital transmission of information through stochastic channels; analog-digital conversion, entropy and information, Huffman coding; signal detection, the matched-filter receiver, probability of error; baseband and passband modulation, signal space representation of signals, PAM, QAM, PSK, FSK; block coding, convolutional coding; synchronization; communication through fading channels; spread-spectrum signaling; simulation of digital communication systems.
Prerequisites: Grade of C or better in ECEN 314 and ECEN 303 or STAT 211; junior or senior classification.

ECEN 457 Operational Amplifiers
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Analysis of basic operational amplifier and operational transconductance amplifier (OTA) circuits; noise analysis in Op amp and OTA circuits; nonlinear OTA and Op amp circuits; instrumentation amplifiers; transducer circuits; function generators; oscillators and D/A converters and basics of switched-capacitor circuits.
Prerequisite: Grade of C or better in ECEN 325; junior or senior classification.

ECEN 458 Active Filter Analysis and Design
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Systematic analysis and design for active RC filters; continuous-time; switched-capacitor circuits; filter approximations; synthesis techniques; sensitivity; practical considerations for monolithic integrated filters; experimental and computer-simulation verification.
Prerequisite: Grade of C or better in ECEN 325; junior or senior classification.

ECEN 459 Power System Fault Analysis and Protection
Credits 4. 3 Lecture Hours. 2 Lab Hours.
General considerations in transmission and distribution of electrical energy as related to power systems; calculation of electric transmission line constants; general theory of symmetrical components and application to analysis of power systems during fault conditions.
Prerequisite: Grade of C or better in ECEN 215 or ECEN 314; junior or senior classification.

ECEN 460 Power System Operation and Control
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Load flow studies; power system transient stability studies; economic system loading and automatic load flow control.
Prerequisite: Grade of C or better in ECEN 215 or ECEN 314; junior or senior classification.

ECEN 462 Optical Communication Systems
Credits 3. 3 Lecture Hours.
Principles of optical communication systems; characteristics of optical fibers, lasers and photodetectors for use in communication systems; design of fiber-optic digital systems and other optical communication systems.
Prerequisites: Grade of C or better in ECEN 322 and ECEN 370; junior or senior classification.

ECEN 463/BMEN 427 Magnetic Resonance Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Design, construction and application of instrumentation for MR imaging; fundamentals of the architecture of an MR spectrometer and the gradient subsystem used for image localization; emphasis on the radiofrequency sensors and systems used for signal generation and reception.
Prerequisites: BMEN 420 or ECEN 410 or ECEN 411 or approval of instructor; junior or senior classification.
Cross Listing: BMEN 427.

ECEN 464 Optical Engineering
Credits 3. 3 Lecture Hours.
Ray optics; wave optics; propagation, reflection, refraction and diffraction of light; passive optical components, polarization, optical modulators, interferometers and lasers.
Prerequisites: Grade of C or better in ECEN 322 and ECEN 370; junior or senior classification.

ECEN 465 Experimental Optics
Credits 4. 2 Lecture Hours. 7 Lab Hours.
In-depth study of experimental optic techniques; opto-mechanical assemblies; passive optics; interferometers; opto-electronics; basic op-amp circuits; feedback and control of optics with electronics.
Prerequisite: Junior or senior classification or approval of instructor.
ECEN 467 Harnessing Solar Energy: Optics, Photovoltaics and Thermal Systems  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Solar radiation characteristics and measurement; optical coatings including reflection, transmission, absorption and emissivity; concentrating optics, tracking and etendue limit; photovoltaic cells, modules and systems overview; introduction to solar thermal systems.  
Prerequisites: Grade of C or better in ECEN 322 and ECEN 370; junior or senior classification.  

ECEN 468 Advanced Digital System Design  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Design, modeling and verification of complex digital systems using hardware description language and electronic system level language.  
Prerequisite: Grade of C or better in ECEN 248; junior or senior classification.  

ECEN 469 Advanced Computer Architecture  
Credits 3. 3 Lecture Hours.  
Advanced computer architectures including memory designs, pipeline techniques, and parallel structures such as vector computers and multiprocessors.  
Prerequisite: ECEN 350/CSCE 350.  

ECEN 472 Microelectronic Circuit Fabrication  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Fundamentals of MOS and bipolar microelectronic circuit fabrication; theory and practice of diffusion, oxidation, ion implantation, photolithography, etch; yield and reliability considerations; statistical process control; integrated process design, simulation and characterization.  
Prerequisites: Grade of C or better in ECEN 325 and ECEN 370; junior or senior classification.  

ECEN 473 Microelectronic Device Design  
Credits 3. 3 Lecture Hours.  
General processes for the fabrication of microelectronic devices and integrated circuits; a review of the electronic properties of semiconductors and carrier transport and recombination; analysis and characterization of p-n junctions, bipolar transistors, and MOS capacitors and transistors; design considerations for achieving optimum performance and practical structures are discussed.  
Prerequisites: Grade of C or better in ECEN 325 and ECEN 370; junior or senior classification.  

ECEN 474 VLSI Circuit Design  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Analysis and design of monolithic analog and digital integrated circuits using NMOS, CMOS and bipolar technologies; device modeling; CAD tools and computer-aided design; design methodologies for LSI and VLSI scale circuits; yield and economics; test and evaluation of integrated circuits.  
Prerequisite: ECEN 326.  

ECEN 475 Introduction to VLSI Systems Design  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Introduction to design and fabrication of microelectronic circuits; emphasis on very large scale integration (VLSI) digital systems; use of state-of-the-art design methodologies and tools; design of small to medium scale integrated circuits for fabrication.  
Prerequisites: Grade of C or better in ECEN 248 and ECEN 325; junior or senior classification.  

ECEN 477 Photonics: Fiber and Integrated Optics  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Photonics lab including optical power and spectral measurements of singlemode and multimode optical fibers, hands-on arc fusion splicing, lasers, amplifiers, interferometers, photodetectors, integrated optics, fiber-optic devices, optical modulators.  
Prerequisite: Grade of C or better in ECEN 322 and ECEN 370; junior or senior classification.  

ECEN 478 Wireless Communications  
Credits 3. 3 Lecture Hours.  
Overview of wireless applications, models for wireless communication channels, modulation formats for wireless communications, multiple access techniques, wireless standards.  
Prerequisites: ECEN 455; junior or senior classification.  

ECEN 480 RF and Microwave Wireless Systems  
Credits 3. 3 Lecture Hours.  
Introduction to various RF and microwave system parameters, architectures and applications; theory, implementation, and design of RF and microwave systems for communications, radar, sensor, surveillance, navigation, medical and optical applications.  
Prerequisite: Grade of C or better in ECEN 214 or ECEN 248; junior or senior classification; approval of instructor and internship agency.  

ECEN 484 Professional Internship  
Credits 0-1. 0-1 Lecture Hours.  
Professional internship in a private company, government agency or laboratory, university or organization to provide work and/or research experience related to the student's major and career objectives. May be taken three times for credit.  
Prerequisites: Grade of C or better in ECEN 214 or ECEN 248; junior or senior classification; approval of instructor and internship agency.  

ECEN 485 Directed Studies  
Credits 0 to 6. 0 to 6 Other Hours.  
Problems of limited scope approved on an individual basis intended to promote independent study.  
Prerequisites: Senior classification; approval of department head.  

ECEN 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 7 Lab Hours.  
Selected topics in an identified area of electrical engineering. May be repeated for credit.  
Prerequisite: Approval of instructor.  

ECEN 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in electrical engineering. May be repeated 3 times for credit.  
Prerequisites: Junior or senior classification and approval of instructor.  

ECHE-Early Chldhd Ed Fld Based (ECHE)  

ECHE 244 School, Family and Community Dynamics in Early Childhood Education  
Credits 3. 3 Lecture Hours.  
Study of the family unit, home-school relationships; strategies for building cooperative activities with parents in the education of their children; healthy parent-school-community relationships; developing collaboration, communication, leadership and advocacy skills; increased sensitivity to cross-cultural issues and strategies for collaboration.
ECHE 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in early childhood education. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ECHE 321 The Young Child and Early Childhood Education
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Examines the world of the contemporary child, its demographics and diversity; explores the philosophical and historical foundation of early childhood education; examines early childhood programs and practices serving young children from birth through age nine; translates child development theory into developmentally appropriate practice.
Prerequisites: ECHE 244; junior classification.

ECHE 342 Strategies for Teaching Young Children
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Application of sound principles of early childhood pedagogical best practices informed by research, child development and clinical literature; explores developmentally appropriate instructional strategies practiced at each age and grade level; examines effective learning environments, teacher-child interaction, cooperative grouping and inquiry strategies for teaching and learning.
Prerequisites: ECHE 244, ECHE 321; junior classification.

ECHE 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in early childhood education. May be repeated 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

ECMT - Econometrics (ECMT)

ECMT 461 Economic Data Analysis
Credits 3. 3 Lecture Hours.
Concepts of statistical description, probability theory and statistical inference as they apply to economic analysis; data management, data handling and data analysis; focus on economic statistics with emphasis on regression analysis.
Prerequisite: MATH 141 or equivalent.

ECMT 463 Introduction to Econometrics
Credits 3. 3 Lecture Hours.
Application of mathematics and statistics to interpret economic phenomena; elementary econometric models and estimation techniques useful for estimating economic relationships and theories.
Prerequisites: ISTM 209; ECON 323; MATH 131 or MATH 142; STAT 211 or STAT 303.

ECMT 475 Economic Forecasting
Credits 3. 3 Lecture Hours.
Econometric approach to prediction and forecasting; data mining and in-sample overfitting; exploratory data analysis; model selection; recursive techniques; structural change; nonlinear models; causality; forecast evaluation and combination; practical issues in real world prediction and forecasting.
Prerequisites: ECMT 463; junior or senior classification.

ECON - Economics (ECON)

ECON 202 Principles of Economics
Credits 3. 3 Lecture Hours.
(ECON 2302) Principles of Economics. Elementary principles of economics; the economic problem and the price system; theory of demand, theory of production and the firm, theory of supply; the interaction of demand and supply.

ECON 203 Principles of Economics
Credits 3. 3 Lecture Hours.
(ECON 2301) Principles of Economics. Measurement and determination of national income, employment and price; introduction to monetary and fiscal policy analysis; the effects of government deficits and debt, exchange rates and trade balances.
Prerequisite: ECON 202 or approval of undergraduate advisor.

ECON 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed studies in specific problem areas of economics. May be repeated for credit.
Prerequisite: Freshman or sophomore classification; approval of instructor.

ECON 289 Special Topics in...
Credits 3. 3 Lecture Hours.
Selected topics in an identified area of economics. May be repeated for credit.
Prerequisite: Approval of undergraduate advisor.

ECON 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in economics. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification.

ECON 311 Money and Banking
Credits 3. 3 Lecture Hours.
Fundamental principles of money, credit, and banking; arbitrage conditions in domestic and international capital markets; theoretical and institutional analysis of money markets.
Prerequisite: ECON 203.

ECON 312 Poverty, Inequality and Social Policy
Credits 3. 3 Lecture Hours.
Determinants of inequality in market earnings; philosophical and economic reasons for redistributing income; issues in measurement of inequality and poverty; examination of major social insurance and welfare programs and how they affect income distribution and performance of the economy.
Prerequisite: ECON 232 or concurrent enrollment.

ECON 315 Sports Economics
Credits 3. 3 Lecture Hours.
Application of economic concepts to the business and practice of sports; taxpayer funding of stadiums; applications of game theory to sports; impact of imperfect information; pricing strategies; testing models of discrimination in sports markets.
Prerequisite: ECON 202.
ECON 318/WGST 318 The Economics of Gender and Race
Credits 3.3 Lecture Hours.
Theories and evidence on gender and race differences in labor market outcomes; labor supply and the role of family formation; the effect of human capital and discrimination on earnings; analysis of government policies; international comparisons.
Prerequisites: 6 hours from ECON 202, STAT 303, 3 hours in WGST above 200 level; junior or senior classification.
Cross Listing: WGST 318/ECON 318.

ECON 320 Economic Development of Europe
Credits 3.3 Lecture Hours.
Development of wage system expansion of markets, Industrial Revolution, relation of industrial development to political policy.
Prerequisites: ECON 202 and ECON 203.

ECON 322 Applied Microeconomic Theory
Credits 3.3 Lecture Hours.
Use of microeconomic theory in the analysis of problems that would face decision makers, not only in business but also in government, non-profit firms and other institutions.
Prerequisite: ECON 202. May not be counted toward a major in economics.

ECON 323 Microeconomic Theory
Credits 3.3 Lecture Hours.
Determination of prices and their role in directing consumption, production, and distribution under both competitive and non-competitive market situations.
Prerequisites: ECON 202 and MATH 142.

ECON 324 Comparative Economic Systems
Credits 3.3 Lecture Hours.
Foundations of the market economy, market socialism, and economic planning; comparative performance of these alternative institutional arrangements; economies in transition.
Prerequisites: ECON 202 and ECON 203.

ECON 328 Economics of Education
Credits 3.3 Lecture Hours.
Application of economic analysis to education policy; theoretical basis for private and public investment in education; returns to education; the importance of school resources, school financing, school choice, and accountability.
Prerequisites: ECON 202; STAT 211, STAT 303 or equivalent.

ECON 330 Economic Development
Credits 3.3 Lecture Hours.
A study of the less developed world; economic problems and solutions.
Prerequisites: ECON 202 and ECON 203.

ECON 410 Macroeconomic Theory
Credits 3.3 Lecture Hours.
Theory of the determination of aggregate levels of national income, employment and prices; monetary and fiscal policy analysis, effects of government debt and deficits.
Prerequisite: ECON 203.

ECON 412 Public Finance
Credits 3.3 Lecture Hours.
Economic role of governments; the choice of public sector output in a democracy and the effects of various taxes on resource allocation and income distribution.
Prerequisite: ECON 323.

ECON 414 Health Economics
Credits 3.3 Lecture Hours.
Economics of health care in the U.S.; role of third party payers; supply and demand for health care; structure and consequences of public and private insurance; role of competition in health care markets among hospitals, insurance plans, physicians and pharmaceutical manufacturers; role of completion and regulation in medical innovation.
Prerequisite: ECON 323.

ECON 418 Economics of Labor
Credits 3.3 Lecture Hours.
Economics of the labor market including factors affecting the economy's demand for labor and the supply of labor; labor market problems such as unemployment and poverty; the economics of trade unions and collective bargaining.
Prerequisite: ECON 323.

ECON 420 Law and Economics
Credits 3.3 Lecture Hours.
Mutual interaction of the prevailing legal system and economic phenomena; development of a series of testable hypotheses concerning the effects of laws and regulations on incentives and economic behavior, the allocation of resources and the distribution of income.
Prerequisite: ECON 323.

ECON 425 The Organization of Industry
Credits 3.3 Lecture Hours.
Relationships between structure, conduct and performance of industries in the American economy using both theoretical and empirical material; antitrust regulation, pricing, product characteristics, advertising, technical change and environmental effects; the American experience contrasted with that of other countries; growth of international industries.
Prerequisite: ECON 323.

ECON 426 Economics of Antitrust and Regulation
Credits 3.3 Lecture Hours.
Bureaucratic and judicial impact of antitrust laws and other regulatory means on the American economy; efficiency gains and losses associated with price discrimination, predation, cartelization, horizontal merger, vertical integration, resale price maintenance; Supreme Court opinions delivered in landmark antitrust cases.
Prerequisite: ECON 323.

ECON 433 Energy Markets and Policy
Credits 3.3 Lecture Hours.
Economics of energy markets and energy regulation with emphasis on implications for optimal energy policy; sectors include gasoline, oil, electricity, natural gas, renewables, nuclear; economic theory integrated with empirical applications from American and international experience; new energy markets, energy trading, and interaction with environmental policy.
Prerequisites: ECON 323 and STAT 211/STAT 303 or approval of instructor; junior or senior classification.

ECON 435 Economics of Resource Scarcity
Credits 3.3 Lecture Hours.
Natural resource management and use; problems of renewable and non-renewable resources including scarcity and market responses; role of property rights, externalities, benefit-cost analysis and energy policy.
Prerequisite: ECON 323.
ECON 436 Environmental Economics
Credits 3. 3 Lecture Hours.
Economic theory and public policy as applied to environmental problems; role of market failure in explaining the existence of pollution; alternative strategies for pollution control and environmental management; global environmental issues.
Prerequisites: ECON 323; Economic majors only.

ECON 440 Experimental Economics
Credits 3. 3 Lecture Hours.
Experimental techniques in economics and survey of literature in experimental economics; credibility of experimental data and criteria for determining reliability; application of statistical treatment to experimental data.
Prerequisite: ECON 323.

ECON 445 Financial Economics
Credits 3. 3 Lecture Hours.
Analysis of money and financial markets; market structures; efficiency; institutional features; international markets; arbitrage; derivative securities; asset pricing in complete and incomplete markets; relation to rest of economy.
Prerequisites: ECON 323; STAT 211 or STAT 303; junior or senior classification.

ECON 449 Economics of Decision-Making Strategy
Credits 3. 3 Lecture Hours.
Introduction to principles of decision-making and analysis of strategic interaction; formal modeling of decision problems involving one or more agents, integrating preferences, risk, and uncertainty into analysis, and using principles of game theory to advise choices; applications include search, signaling, design of contracts, agendas and repeated interaction.
Prerequisites: ECON 323; junior or senior classification.

ECON 452 International Trade Theory and Policy
Credits 3. 3 Lecture Hours.
Basis for trade; theory of comparative advantage; determination of product and factor prices; gains from international trade; commercial policy and its implications for income distribution; concept of effective protection; market distortions, policy generated distortions and the arguments for tariffs.
Prerequisite: ECON 323.

ECON 459 Games and Economic Behavior
Credits 3. 3 Lecture Hours.
Introduction to game theory for advanced undergraduates; definition and existence of an equilibrium point for strategic, repeated and extensive form games; strategic and evolutionary equilibrium refinements; equilibrium selection; applications include auctions, bargaining, oligopoly, strategic market games, team production, voting and behavioral game theory.
Prerequisites: ECON 323; MATH 142 or equivalent or approval of instructor.

ECON 460 Introduction to Mathematical Economics
Credits 3. 3 Lecture Hours.
Introduction to mathematical economics; application of mathematical tools in economic theory; fundamental results from differential and integral calculus; duality theory in consumer and producer theory; classical optimization techniques, elementary differential equations and stability analysis.
Prerequisites: ECON 323 and ECON 410; MATH 131 or MATH 142; junior or senior classification.

ECON 465 Contemporary Economic Issues
Credits 3. 3 Lecture Hours.
Application of microeconomic and macroeconomic analyses to evaluate contemporary economic issues.
Prerequisites: ECON 323 and ECON 410.

ECON 470 Program Evaluation
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Economic approaches to program policy evaluation; empirical microeconomic tools; natural experiments; design experimental and quasi-experimental method.
Prerequisite: ECON 323 or approval of instructor.

ECON 484 Internship
Credits 0 to 3. 0 to 3 Other Hours.
Directed internship in an organization to provide on-the-job training and applied research experience with professionals in settings appropriate to economics and student professional interest. Maximum 3 hours can count toward major. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Major in economics; 12 completed hours of economics including ECON 323; 2.5 cumulative GPA; 2.5 GPA in economic courses; pre-approval of the director of economics internship programs.

ECON 485 Directed Studies
Credits 0 to 6. 0 to 6 Other Hours.
Research and design of specific problem areas approved on an individual basis with the intention of promoting independent study and to supplement existing course offerings. Results of study presented in writing.
Prerequisites: Major or minor in economics; approval of undergraduate advisor.

ECON 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of economics. May be repeated for credit.
Prerequisite: Approval of undergraduate advisor.

ECON 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in economics. May be taken three times for credit.
Prerequisites: Junior or senior classification; ECON 323; ECON 410; ECMT 463.

ECON 495 Contemporary Economic Issues
Credits 3. 3 Lecture Hours.
Application of microeconomic and macroeconomic analyses to evaluate contemporary economic issues.
Prerequisites: ECON 323 and ECON 410.

ECON 470 Program Evaluation
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Economic approaches to program policy evaluation; empirical microeconomic tools; natural experiments; design experimental and quasi-experimental method.
Prerequisite: ECON 323 or approval of instructor.

ECON 484 Internship
Credits 0 to 3. 0 to 3 Other Hours.
Directed internship in an organization to provide on-the-job training and applied research experience with professionals in settings appropriate to economics and student professional interest. Maximum 3 hours can count toward major. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Major in economics; 12 completed hours of economics including ECON 323; 2.5 cumulative GPA; 2.5 GPA in economic courses; pre-approval of the director of economics internship programs.

ECON 485 Directed Studies
Credits 0 to 6. 0 to 6 Other Hours.
Research and design of specific problem areas approved on an individual basis with the intention of promoting independent study and to supplement existing course offerings. Results of study presented in writing.
Prerequisites: Major or minor in economics; approval of undergraduate advisor.

ECON 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of economics. May be repeated for credit.
Prerequisite: Approval of undergraduate advisor.

ECON 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in economics. May be taken three times for credit.
Prerequisites: Junior or senior classification; ECON 323; ECON 410; ECMT 463.
EDCI 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty members in the Department of Teaching, Learning and Culture. May be taken four times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

EDCI 353 Early Childhood through Adolescent Education
Credits 3. 3 Lecture Hours.
Early childhood through adolescent approaches and instructional materials appropriate for EC through middle school programs; impact of research and theory on child development from gestation to early adolescence on instructional practices.
Prerequisites: Admission to teacher education.

EDCI 354 Early Childhood and Adolescent Curriculum and Lesson Design
Credits 3. 3 Lecture Hours.
Examination of curriculum models used in educational environments designed for young children through adolescents and the organization of the curriculum; investigation of state-adopted curriculum knowledge and skills standards and materials as well as their use and expansion.
Prerequisites: EDCI 364 and EDCI 353; concurrent enrollment in TEFB 371.

EDCI 364 Creativity and the Young Child
Credits 3. 3 Lecture Hours.
Creative expression in young children with a focus on artistic and musical expression, creative movement and creative dramatics; creativity as related to development of the right hemisphere of the brain.
Prerequisites: EPSY 320; concurrent enrollment in EDCI 453.

EDCI 365 Using Technology Classrooms
Credits 3. 3 Lecture Hours.
Overview of technology as it relates to the design of instruction and practices that support effective teaching and learning; how learning theories are reflected in and supported by technology; current and emerging applications in technology delivered and supported learning environments.
Prerequisite: Junior or senior classification.

EDCI 455 Home-School Involvement in Early Childhood Education
Credits 3. 3 Lecture Hours.
The family unit, home-school relationships and strategies for building cooperative activities with parents in the education of their children; experience with the development of parent involvement materials.
Prerequisites: EDCI 364 and EDCI 453; admission to teacher education.

EDTC 345 Microcomputer Awareness for Educators
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Focus on both teacher and student utilization; overview of computer operations and instructional integration of word processor, database, spreadsheet, and graphics utilities; telecommunications and Internet functions and resources accessed and developed; includes the design, development, and evaluation of instructional materials and integration of MultiMedia and HyperText resources and techniques.
Prerequisite: Junior classification.

EDTC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of educational technology. May be repeated for credit.
Prerequisite: Approval of instructor.

EHRD 101 Learning Community of Leadership Development in Human Resource Development and Technology Management
Credit 1. 1 Lecture Hour.
Exploration of leadership identity, reflection on lessons learned during the first year of college. Must be taken on a satisfactory/unsatisfactory basis.

EHRD 203 Foundations of Human Resource Development
Credits 3. 3 Lecture Hours.
Overview of the discipline and field of human resource development; focus on how individuals and groups learn and interact with organizations including motivation, group dynamics, systems theory, organizational culture, learning and change.
Prerequisite: Sophomore classification.

EHRD 210 Legal and Ethical Environment of Human Resource Development
Credits 3. 3 Lecture Hours.
Development of knowledge towards legal and ethical work environment in a corporate and educational setting in human resource development.
Prerequisite: Sophomore classification.

EHRD 285 Directed Studies
Credits 0 to 12. 0 to 12 Lecture Hours.
Directed readings or research problems in industrial education.
Prerequisites: Freshman or sophomore classification; approval or directed studies application.

EHRD 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of industrial educational. May be repeated for credit.
Prerequisite: Approval of instructor.

EHRD 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in educational human resource development. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.
EHRD 315 Applied Human Resource Development in the Workplace
Credits 3. 3 Lecture Hours.
Training and development context and synthesis of general industry-
standard human resource practices in workplace environments for
human resource practitioners.
Prerequisites: EHRD 203 and EHRD 210 with a grade of C or better; junior
or senior classification.

EHRD 371 Applied Learning Principles
Credits 3. 3 Lecture Hours.
The overarching purpose of the course is to influence adult educators
to make more intentional choices toward developmental growth in their
work with adult learners; focus on adult learning theories and work
strategies; meets writing intensive course requirement.
Prerequisites: Junior or senior classification and approval of instructor.

EHRD 372 Learning and Development in HRD
Credits 3. 3 Lecture Hours.
Concepts, knowledge and skills to access, design, develop, deliver
and evaluate training programs; foundation of understanding roles
of learning, training and development in organizations and systematic and
evidence-based approach for designing and managing quality training
programs in organizations.
Prerequisites: Grade of C or better in EHRD 203 and EHRD 210; junior or
senior classification; or approval of instructor.

EHRD 374 Organizational Development
Credits 3. 3 Lecture Hours.
Introduction to major theories, concepts, skills and techniques for
organization development in business and industry, education and the
public sector.
Prerequisites: Grade of C or better in EHRD 203 and EHRD 210; junior or
senior classification; or approval of instructor.

EHRD 391 Measurement and Evaluation in Human Resource
Development and Technology Management
Credits 3. 3 Lecture Hours.
Measurement and evaluation techniques in the field of Human
Resource Development and Technology Management; emphasis on
understanding, calculation and application of basic testing, assessment
and interpretation methods.
Prerequisites: Junior or senior classification or approval of instructor;
EHRD 203 with a grade of C or better, MATH 141 and MATH 142.

EHRD 405 Principles and Practices of Leadership in Human Resource
Development and Technology Management
Credits 3. 3 Lecture Hours.
Theories and concepts associated with learning in individuals and
organizations; overview of leadership theories and learning theories
within a context of developing leadership programs.
Prerequisites: Junior or senior classification and approval of instructor.

EHRD 408 Globalization and Diversity in the Workplace
Credits 3. 3 Lecture Hours.
Assist learners in the identification and understanding of globalization
and diversity issues in learning, work and community; exploration of
current issues, theories, trends and policy issues.
Prerequisites: Junior or senior classification and approval of instructor.

EHRD 413 Conflict Management and Dialogue
Credits 3. 3 Lecture Hours.
Conflict management principles and practices in the workplace;
engagement in meaningful conflict from a training and development
perspective.
Prerequisites: Grade of C or better in EHRD 203 and EHRD 210; junior or
senior classification; or approval of instructor.

EHRD 473 Distance Learning Applications
Credits 3. 3 Lecture Hours.
Application of distance learning principles to educational and training
settings via a variety of distance learning modalities.
Prerequisites: Junior or senior classification and approval of instructor.

EHRD 475 Multimedia Development for Training and Instruction
Credits 3. 3 Lecture Hours.
Introduction to the development of multimedia as it applies to training
and development; examine the application of multimedia principles to
educational and training settings for both "face-to-face" and distance
applications.
Prerequisites: Junior or senior classification; or approval of instructor;
ISTM 209 or approved substitution.

EHRD 477 Project Management in Organizations
Credits 3. 3 Lecture Hours.
Application of principles of project management in organizations; focus
on the development of project proposals, project planning using project
management software; management of project personnel and resources.
Prerequisite: Junior or senior classification or approval of instructor.

EHRD 479 Grants and Contracts
Credits 3. 3 Lecture Hours.
Identify funding sources that support research and development
activities; identify methods of securing funding; study state, national and
private funding sources and how to become successful in submitting to
each; complete a proposal to a funding agency and a management plan
for a funded project.
Prerequisites: Junior or senior classification and approval of instructor.

EHRD 481 Career Development Seminar
Credits 3. 3 Other Hours.
Capstone seminar on significant issues of industry; transition from
an academic environment to professional business environment;
preparation of a multi-vector resume; salary negotiation; life skills and
planning; steps in searching and securing an internship position.
Prerequisites: EHRD 203; junior or senior classification, or approval of
instructor.

EHRD 484 Professional Internship
Credits 6. 6 Other Hours.
Directed internship in an organization to provide students with a learning
experience supervised by professionals in organizational settings
appropriate to the student's professional objectives. Must be taken on a
satisfactory/unsatisfactory basis.
Prerequisites: Senior classification and approval of instructor, admitted
to professional phase, EHRD 481, EHRD 490.

EHRD 485 Directed Studies
Credits 0 to 12. 0 to 12 Other Hours.
Directed readings or research problems in industrial education. Term
report required.
Prerequisite: Approval of department head.

EHRD 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 1 to 4 Lab Hours.
Selected topics in an identified area of industrial education. May be
repeated for credit.
Prerequisite: Approval of instructor.
EHRD 490 Research in Human Resource Development/Technology Management
Credits 3. 3 Lecture Hours.
Investigative techniques currently employed in human resource development (HRD) and technology management (TCM) including the context of HRD/TCM research, planning HRD/TCM research, styles of HRD/TCM research, and strategies for data collection and researching.
Prerequisites: Junior or senior classification; admitted to professional phase; EHRD 391 with a grade of C or better.

EHRD 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in human resource development. May be repeated for credit.
Prerequisite: Junior or senior classification.

ENDG - Engr Design Graphics (ENDG)

ENDG 408 Computer Graphics
Credits 3. 3 Lecture Hours.
Current applications of computer graphics to produce orthographic views and rendered pictorials; introduction to several computer graphics software packages including applications in 3-D, parametric solid modeling, animation and rapid prototyping.
Prerequisite: ENDG 105 or ENDG 407 or ENGR 112.

ENDG 409 Professional Computer Animation
Credits 3. 3 Lecture Hours.
Advanced studies in computer graphics with an emphasis on the intricacies of graphical design and how it applies to a cohesive project design.
Prerequisites: ENDG 407 and 408; junior or senior classification.

ENDG 485 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Special problems in engineering design graphics to fit needs of individual students.
Prerequisite: Approval of instructor.

ENDG 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified field of engineering design graphics.
Prerequisite: Approval of instructor.

ENDS - Environmental Design (ENDS)

ENDS 101 Design Process
Credits 3. 3 Lecture Hours.
(Arch 1311) Design Process. Fundamental design processes, issues and theories relevant to design resolution and the creation of new ideas; creative thought processes from the formation of ideas through incubation to final product and future impact on the physical environment and society.

ENDS 105 Design Foundations I
Credits 4. 1 Lecture Hour. 8 Lab Hours.
Visual and functional design principles; development of skills in perception, thought and craft as they apply to the formation of two- and three-dimensional relationships; design attitudes and environmental awareness.
Prerequisite: Major in environmental design.

ENDS 106 Design Foundations II
Credits 4. 1 Lecture Hour. 6 Lab Hours.
Approaches to problem identification and problem solving emphasizing an awareness of human, physical and cultural factors influencing design; reinforcement of visual and verbal communication as applied to the design process.
Prerequisite: ENDS 105.

ENDS 108 Design and Visual Communication Foundations II
Credits 5. 1 Lecture Hour. 12 Lab Hours.
Approaches to problem identification and problem solving emphasizing human, physical and cultural factors influencing architectural design; understanding of space, materiality and tectonics in a human body scale; development of drawing methods with emphasis on analytical drawing; reinforcement of visual and verbal communication as applied to design processes.
Prerequisite: ENDS 105 and ENDS 115.

ENDS 114 Introduction to Design Communication
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Introduction to drawing methods for non-majors; free hand drawing as a creative and communicative tool to express design thinking, architectural form and space.

ENDS 115 Design Communication Foundations
Credits 3. 1 Lecture Hour. 4 Lab Hours.
(Arch 1307) Design Communication Foundations. Introduction to and practice of tools, methods, techniques available for graphic communication; graphic communication and the design process; observation and other forms of free-hand drawing and drawing systems that develop representational and descriptive capabilities.
Prerequisite: Major in environmental design.

ENDS 116 Design Communication Foundations II
Credits 3. 1 Lecture Hour. 4 Lab Hours.
(Arch 1308) Design Communication Foundations II. Introduction to design drawing using a wide variety of tools ranging from conventional drafting and drawing equipment to the latest digital graphic applications; a focused investigation of analytical drawing as it contributes to the design process; experience of a wide variety of drawing conventions intended to equip students to navigate a design process.
Prerequisites: ENDS 115 and concurrent enrollment in ENDS 106.

ENDS 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Special problems in environmental design. May be repeated for up to 12 credit hours.
Prerequisite: Approval of instructor and degree coordinator.

ENDS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified field of environmental design. May be repeated for up to 9 credit hours.
Prerequisite: Approval of instructor or department head.

ENDS 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in environmental design. May be repeated 2 times for credit.
Prerequisites: Admission to upper level in environmental design; approval of instructor and department head.
ENGL - English (ENGL)

ENGL 103 Introduction to Rhetoric and Composition
Credits 3.3 Lecture Hours.
(ENGL 1301) Introduction to Rhetoric and Composition. Intensive study of and practice in writing processes, from invention and researching to drafting, revising and editing, both individually and collaboratively; emphasis on effective rhetorical choices including audience, purpose, arrangement and style; focus on writing the academic essay as a vehicle for learning, communicating and critical analysis.

ENGL 104 Composition and Rhetoric
Credits 3.3 Lecture Hours.
(ENGL 1302) Composition and Rhetoric. Focus on referential and persuasive researched essays through the development of analytical reading ability, critical thinking and library research skills; for freshman and sophomore students only.

ENGL 107 Introduction to the Health Humanities
Credits 3.3 Lecture Hours.
Introduction to the methods and approaches of the health humanities; exposure to key scholarship in this field as well as major methods and approaches; application of such skills to the analysis of cultural case studies such as illness narratives or contemporary debates in scientific bioethics.
Cross Listing: COMM 107, HIST 107, and HHUM 107.

ENGL 201 Approaches to Literary
Credits 3.3 Lecture Hours.
Origins, functions, and philosophies of literacy; theories of text analysis; development of a broader concept of literacy; enhancement of instruction of communication skills.

ENGL 202 Environmental Literature
Credits 3.3 Lecture Hours.
Texts from various periods and locations and in various genres and media that focus on the relationship of human beings to the rest of the natural world; topics vary from each section.

ENGL 203 Writing about Literature
Credits 3.3 Lecture Hours.
Exploration of literature by genre and/or theme; literary analysis and interpretation; intensive writing about literature.

ENGL 204/AFST 204 Introduction to African-American Literature
Credits 3.3 Lecture Hours.
Introduction to the writings of African Americans from the 18th century to the present, emphasizing the major themes and traditions.
Cross Listing: AFST 204/ENGL 204.

ENGL 205/AFST 205 Introduction to Africana Literature
Credits 3.3 Lecture Hours.
Works, literary movements and genres of authors of African descent in the Americas, Europe and Africa.
Cross Listing: AFST 205/ENGL 205.

ENGL 206 Twenty-first Century Literature and Culture
Credits 3.3 Lecture Hours.
Exploration of contemporary literature and culture; such topics as the new multicultural millennium; responses to September 11 and new global realities; the transformation of popular genres.

ENGL 207 Human Thinking and Digital Culture
Credits 3.3 Lecture Hours.
Introduction to methodology, scope and practice of digital humanities; overview of digital research culture; evaluation of digital media as tools for thinking.

ENGL 209/LING 209 Introduction to Linguistics
Credits 3.3 Lecture Hours.
Nature of human language and of linguistics; includes an introduction to phonology, syntax, semantics and morphology and the role of spoken and written discourse in sustaining societal arrangements.
Cross Listing: LING 209/ENGL 209. Credit cannot be given for both ENGL 209/LING 209 and LING 209/ENGL 209.

ENGL 210 Technical and Business Writing
Credits 3.3 Lecture Hours.
(ENGL 2311) Technical and Business Writing. Focus on writing for professional settings; correspondence and researched reports fundamental to the technical and business workplace—memoranda, business letters, research proposals and presentations, use of graphical and document design; emphasis on audience awareness, clarity of communication and collaborative team-work.

ENGL 211/INTS 211 Foundations in Cultural Studies
Credits 3.3 Lecture Hours.
Introduction to history, influence and major ideas of Cultural Studies; use of culture as a means to critique social problems and understand social forces; analysis of culture in its relationship to power; participation in project investigating contemporary U.S. youth subcultures.
Cross Listing: INTS 211/ENGL 211.

ENGL 212 Shakespeare
Credits 3.3 Lecture Hours.
Exploration of selected works of Shakespeare.

ENGL 219 Literature and the Other Arts
Credits 3.3 Lecture Hours.
Imaginative literature in conversation with aesthetic principles and such other arts as painting, sculpture, architecture, film and music.

ENGL 221/MODL 221 World Literature
Credits 3.3 Lecture Hours.
(ENGL 2332) World Literature. Survey of world literature from the ancient world through the sixteenth century in relation to its historical and cultural contexts; texts selected from a diverse group of authors, traditions and genres.
Cross Listing: MODL 221/ENGL 221.

ENGL 222/MODL 222 World Literature
Credits 3.3 Lecture Hours.
(ENGL 2333) World Literature. Survey of world literature from the seventeenth century to the present in relation to its historical and cultural contexts; texts selected from a diverse group of authors, traditions and genres.
Cross Listing: MODL 222/ENGL 222.

ENGL 227 American Literature: The Beginnings to Civil War
Credits 3.3 Lecture Hours.
(ENGL 2327) American Literature: The Beginnings to Civil War. Representative writers, genres and movements of the period.

ENGL 228 American Literature: Civil War to Present
Credits 3.3 Lecture Hours.
(ENGL 2328) American Literature: Civil War To Present. Expressions of the American experience in realism, regionalism and naturalism; varieties of modernist and contemporary writing; the rise of ethnic literature and experimental literary forms.

ENGL 231 Survey of English Literature I
Credits 3.3 Lecture Hours.
(ENGL 2322) Survey of English Literature I. Literature of England from Anglo-Saxon times through the 18th century.
ENGL 232 Survey of English Literature II  
Credits 3. 3 Lecture Hours.  
(ENGL 2323) Survey of English Literature II. Literary works from the late 18th century to the 21st century by authors in Great Britain and its colonies.

ENGL 235 Elements of Creative Writing  
Credits 3. 3 Lecture Hours.  
(ENGL 2307) Elements of Creative Writing. Initiation into the craft of creative writing in prose and poetry; extensive reading in the genres; peer workshops.

ENGL 241 Advanced Composition  
Credits 3. 3 Lecture Hours.  
Focuses on the writing of advanced academic and professional prose by integrating computer technology in the analysis and production of that prose.

ENGL 251/FILM 251 Introduction to Film Analysis  
Credits 3. 3 Lecture Hours.  

ENGL 253 Introduction to Cultural Studies and Popular Culture  
Credits 3. 3 Lecture Hours.  
Introduction to Cultural Studies and Popular Cultural. An introduction to the history, theories and methods of contemporary cultural studies. The course will explore key concepts in cultural theory to examine specific aspects of popular culture as well as cultural sites and practices so as to expand upon the analytical and critical thinking skills learned in ENGL 104 and 203. Prerequisite: ENGL 104.

ENGL 285 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Readings selected for specific need of major or minor in English.

ENGL 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of English. May be repeated for credit.

ENGL 291 Research  
Credits 0 to 3. 0 to 3 Lecture Hours.  
Research conducted under the direction of faculty member in English. Prerequisites: 3 hours of 200-level literature; freshman or sophomore classification and approval of instructor.

ENGL 303 Approaches to English Studies  
Credits 3. 3 Lecture Hours.  
A writing intensive exploration of the methodologies and major topics of English studies. Prerequisite: ENGL 104 or registration therein; junior or senior classification or approval of instructor.

ENGL 304 Topics in Digital Research  
Credits 3. 3 Lecture Hours.  
Topics in the studies of digital humanities; introduction to making/interpreting digital materials, the surrogates of books, paintings, etc., that form our cultural heritage, as well as digitally-born literature, art and culture; reflection on digital cultures/digital archives; theory and practice of creating and research digital resources. May be taken three times for credit. Prerequisite: Junior or senior classification or approval of instructor.

ENGL 305 Texas Literature  
Credits 3. 3 Lecture Hours.  
Examination of Texas literature, culture and multi-media; exploration of the development of Texas identities and responses to the rich cultural diversity within the state; topics vary from each section. Prerequisite: Junior or senior classification.

ENGL 306 Transnational Literature and Culture  
Credits 3. 3 Lecture Hours.  
Examination of texts written in English that de-center the nation-state as the central way to organize cultural comparision; includes colonialism, economics, empire, globalization, migration, race and refugees. Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification or approval of instructor.

ENGL 308 History of Literary Criticism  
Credits 3. 3 Lecture Hours.  
History of literary thought from antiquity to the present, including writers such as Plato, Aristotle, "Longinus," Sidney, Shelley, and Dryden; analysis of genres such as tragedy, lyric, and film; critical approaches such as new criticism, structuralism, deconstruction, Marxism, feminism, new historicism, and film studies. Prerequisite: 3 credits of literature at 200-level or above.

ENGL 310/LING 310 History of the English Language  
Credits 3. 3 Lecture Hours.  
Phonological, grammatical and lexical history of the English language; brief discussion of some other Indo-European languages; principles of linguistic change, as reflected in English. Prerequisite: Junior or senior classification. Cross Listing: LING 310/ENGL 310.

ENGL 313 Medieval English Literature  
Credits 3. 3 Lecture Hours.  
Old and Middle English literature exclusive of Chaucer, including such authors and works as Beowulf, The Dream of the Rood, Sir Gawain and the Green Knight, Piers Plowman, Malory, Julian of Norwich, Kempe, the mystery plays and the lyrics. Prerequisite: 3 credits of literature at 200-level or above.

ENGL 314 The English Renaissance  
Credits 3. 3 Lecture Hours.  
Period course in the poetry, prose and drama of England in the 16th century. Prerequisite: 3 credits of literature at 200-level or above.

ENGL 315 Seventeenth-Century Literature  
Credits 3. 3 Lecture Hours.  
Period course in English poetry, prose and drama of the 17th century. Prerequisite: 3 credits of literature at 200-level or above.

ENGL 316 Eighteenth-Century Literature and Culture  
Credits 3. 3 Lecture Hours.  
Period course in English poetry, prose and drama of the 18th century. Prerequisite: 3 credits of literature at 200-level or above.

ENGL 317 Early British Drama  
Credits 3. 3 Lecture Hours.  
Period course in early British, non-Shakespearean drama to 1642. Prerequisite: 3 credits of literature at the 200-level or above.

ENGL 320 Technical and Professional Editing  
Credits 3. 3 Lecture Hours.  
Principles and techniques of technical editing for print and electronic media, including standards, style, copy-editing, comprehensive editing and project management. Prerequisite: ENGL 210.
ENGL 321 Nineteenth-Century Literature (Romantic)  
Credits 3. 3 Lecture Hours.  
Representative texts in English generated throughout the British empire  
in the late-18th and early-19th centuries.  
Prerequisite: 3 credits of literature at 200-level or above.

ENGL 322 Nineteenth-Century Literature (Victorian)  
Credits 3. 3 Lecture Hours.  
Period course in English poetry and prose of major Victorian authors.  
Prerequisite: 3 credits of literature at 200-level or above.

ENGL 323 The American Renaissance  
Credits 3. 3 Lecture Hours.  
Period course in the American Renaissance, covering such writers as  
Emerson, Hawthorne, Thoreau, Alcott, Fuller, Douglass, Melville, Poe,  
Stowe and Whitman.  
Prerequisite: 3 credits of literature at 200-level or above.

ENGL 329/AFST 329 African-American Literature Pre-1930  
Credits 3. 3 Lecture Hours.  
Major works of the African-American literary tradition from the 18th  
century to 1930 studied within cultural and historical context.  
Prerequisites: 3 credits of literature at 200-level or above.  
Cross Listing: AFST 329/ENGL 329.

ENGL 330 Arthurian Literature  
Credits 3. 3 Lecture Hours.  
Legend of King Arthur in English and American literature from its  
Medieval origins to the present.  
Prerequisite: Junior or senior classification.

ENGL 331 Fantasy Literature  
Credits 3. 3 Lecture Hours.  
An exploration of origins and development of fantasy literature, including  
representative writers, genres and texts.  
Prerequisites: Junior or senior classification.

ENGL 333/WGST 333 Gay and Lesbian Literature  
Credits 3. 3 Lecture Hours.  
Gay and lesbian literature from classical times to present, studied in its  
historical and cultural context.  
Prerequisite: Junior or senior classification.  
Cross Listing: WGST 333/ENGL 333.

ENGL 334 Science Fiction Present and Past  
Credits 3. 3 Lecture Hours.  
Origins and development of the science fiction genre.  
Prerequisite: Junior or senior classification.

ENGL 335 Literature of the Sea  
Credits 3. 3 Lecture Hours.  
Significance of the sea in fictional and factual accounts, such as novels,  
short stories, poems, and narratives of sailors and seafaring life.  
Prerequisites: Three credits of literature at 200 level or above. Junior or  
senior classification or approval of instructor.

ENGL 336 Life and Literature of the Southwest  
Credits 3. 3 Lecture Hours.  
Exploration of Southwestern literature, including such authors as Abbey,  
Anaya, Cabeza de Vaca, Cather, Krutch, McCarty, Momaday, Paz, Paredes  
and Porter.  
Prerequisite: Junior or senior classification.

ENGL 337 Life and Literature of the American South  
Credits 3. 3 Lecture Hours.  
Study of writing and culture of the American South based on reading and  
analysis of key texts by representative authors.  
Prerequisite: Junior or senior classification.

ENGL 338 American Ethnic Literature  
Credits 3. 3 Lecture Hours.  
Multi-ethnic study of American Literature, the writings of Black  
Americans, American Indians, Latinos/Latinas, Jewish Americans, as well  
as other ethnic groups.  
Prerequisite: Junior or senior classification.

ENGL 339/AFST 339 African-American Literature Post-1930  
Credits 3. 3 Lecture Hours.  
Major works of the African-American literary tradition from the 1930s to  
the present studied in their cultural and historical context.  
Prerequisites: 3 credits of literature at 200-level or above.  
Cross Listing: AFST 339/ENGL 339.

ENGL 340 Modern and Contemporary Drama  
Credits 3. 3 Lecture Hours.  
Representative plays and performances from the late nineteenth century  
to the present.  
Prerequisite: 3 credits of literature at 200-level or above.

ENGL 345 Writers’ Studies: Prose or Poetry  
Credits 3. 3 Lecture Hours.  
A different topic for fiction writers or poets each term; may include  
historical development of genres; connection between biography and  
artistic production; study of writers’ theories of the art of fiction or poetry.  
Prerequisites: ENGL 235; junior or senior classification.

ENGL 347 Writers’ Workshop: Prose  
Credits 3. 3 Lecture Hours.  
Production of advanced, complete stories; peer workshops; extensive  
reading. May be repeated 1 time for credit.  
Prerequisite: ENGL 235; junior or senior classification or approval of  
instructor.

ENGL 348 Writers’ Workshop: Poetry  
Credits 3. 3 Lecture Hours.  
Production of advanced, complete poems; peer workshops; extensive  
reading. May be repeated 1 time for credit.  
Prerequisite: ENGL 235; junior or senior classification or approval of  
instructor.

ENGL 350 Twentieth-Century Literature to World War II  
Credits 3. 3 Lecture Hours.  
Novelists, poets and dramatists writing in English from the late  
nineteenth to mid-twentieth century.  
Prerequisite: 3 credits of literature at 200-level or above; junior or senior  
classification or approval of instructor.

ENGL 351/FILM 351 Advanced Film  
Credits 3. 3 Lecture Hours.  
A different film topic each term; sample topics include major directors,  
historical periods, fiction into film, film genres. May be repeated for credit.  
Prerequisite: ENGL 251/FILM 251 or FILM 251/ENGL 251 or FILM 301 or  
approval of instructor; junior or senior classification.  
Cross Listing: FILM 351/ENGL 351.

ENGL 352 Literature, World War II to Present  
Credits 3. 3 Lecture Hours.  
Novelists, poets and dramatists from the World War II era to the present.  
Prerequisite: Junior or senior classification.

ENGL 353 History of Rhetoric  
Credits 3. 3 Lecture Hours.  
Exploration of the major approaches to the theory and practice of oral  
and written rhetoric and discourse up to the end of the 19th century.  
Prerequisite: Junior or senior classification.
ENGL 354 Modern Rhetorical Theory  
**Credits 3. 3 Lecture Hours.**  
Study of 20th and 21st century rhetorical theories and theorists; focus on relationships among rhetoric and culture, such as rhetoric in oral and textual communities, rhetoric as a method of literary interpretation, rhetoric and linguistics, rhetoric as theorized and taught across academic communities.  
**Prerequisite:** Junior or senior classification.

ENGL 355 The Rhetoric of Style  
**Credits 3. 3 Lecture Hours.**  
Fosters an appreciation for and better understanding of English prose style; the history of English prose; representative prose models for analysis and imitation; the impact of computer analysis.  
**Prerequisite:** Junior or senior classification.

ENGL 356/FILM 356 Literature and Film  
**Credits 3. 3 Lecture Hours.**  
Novels and films based on them; writers and filmmakers such as Virginia Woolf, John Steinbeck, John Ford, Sally Potter, John Huston, Charlotte Bronte and Peter Bogdanovich.  
**Prerequisites:** 3 credits of literature at the 200-level or above; junior or senior classification or approval of instructor.  
**Cross Listing:** FILM 356/ENGL 356.

ENGL 357 Native American Rhetorics and Literatures  
**Credits 3. 3 Lecture Hours.**  
Examination of Native American rhetorics and literatures with a focus on the relationship between composed, performed, and material rhetorics; covering Native American rhetors and writers from pre-colonization to the present and contextualizing them within contemporary Native issues.  
**Prerequisite:** Junior or senior classification or approval of instructor.

ENGL 359 Forms of Creative Writing  
**Credits 3. 3 Lecture Hours.**  
Major forms of writing in prose or poetry, depending on instructor; analysis of structure coupled with writing assignments illustrating principles of form in narrative and/or lyrical modes. May be taken three times for credit.  
**Prerequisites:** ENGL 235; junior or senior classification.

ENGL 360 Literature for Children  
**Credits 3. 3 Lecture Hours.**  
Representative writers, genres, texts and movements.  
**Prerequisite:** Junior or senior classification.

ENGL 361 Young Adult Literature  
**Credits 3. 3 Lecture Hours.**  
Survey of historical and contemporary literature for adolescents, including such forms as fantasy, domestic fiction, and the problem novel.  
**Prerequisite:** Junior or senior classification.

ENGL 362/HISP 362 Latino/a Literature  
**Credits 3. 3 Lecture Hours.**  
Literature by U.S.-based Latino/a authors writing mostly in English; examination of historical and social contexts of cultural production; may include novels, poetry, short stories, plays, and films to gain understanding of aesthetic expression of diverse Latino/a authors, including but not limited to Mexican Americans, Puerto Ricans, Cuban Americans, and Dominican Americans.  
**Prerequisite:** Junior or senior classification.  
**Cross Listing:** HISP 362/ENGL 362.

ENGL 365/RELS 360 The Bible as Literature  
**Credits 3. 3 Lecture Hours.**  
**Prerequisite:** Junior or senior classification.  
**Cross Listing:** RELS 360/ENGL 365.

ENGL 372 American Poetry  
**Credits 3. 3 Lecture Hours.**  
Exploration of the development of American poetic traditions, with an emphasis on the major poetry of 19th and 20th centuries.  
**Prerequisite:** 3 credits of literature at 200-level or above.

ENGL 373 American Realism and Naturalism  
**Credits 3. 3 Lecture Hours.**  
Exploration of the literature produced in the United States between the Civil War and World War I, such as works by Twain, James, Freeman, Jewett, Chesnutt, Crane, Dreiser, Wharton.  
**Prerequisites:** 3 credits of literature at 200-level or above.

ENGL 374/WGST 374 Women Writers  
**Credits 3. 3 Lecture Hours.**  
History of literature by women in English; emphasis on continuity of ideas and on literary contributions; study of a variety of genres with particular attention to the significance of gender in the racial, social, sexual and cultural contexts of women writing in English.  
**Prerequisite:** Junior or senior classification.  
**Cross Listing:** WGST 374/ENGL 374.

ENGL 375 Nineteenth-Century American Novel  
**Credits 3. 3 Lecture Hours.**  
An exploration of the development of the American novel; study of representative novels from the early national period, the American Renaissance, and realism and naturalism.  
**Prerequisite:** 3 credits of literature at 200-level or above.

ENGL 376 The American Novel Since 1900  
**Credits 3. 3 Lecture Hours.**  
Representative novels of 20th and 21st century American writers; emphasis on varied literary movements and on thematic and formal innovations as reflections of/responses to social transformations in American society since 1900.  
**Prerequisite:** Junior or senior classification.

ENGL 377 The British Novel to 1870.  
**Credits 3. 3 Lecture Hours.**  
Representative works illustrating the development of the novel, by writers resident in Great Britain and its colonies, from its beginnings to the late nineteenth century.  
**Prerequisite:** 3 credits of literature at 200-level or above.

ENGL 378 The British Novel, 1870 to Present.  
**Credits 3. 3 Lecture Hours.**  
Representative works illustrating development of the novel by writers resident in Great Britain and its colonies from the late nineteenth century forward.  
**Prerequisite:** Junior or senior classification.

ENGL 379/AFST 379 Postcolonial Literatures  
**Credits 3. 3 Lecture Hours.**  
Exploration of key terms, themes and debates within global literature written by colonized, occupied and diasporic peoples.  
**Prerequisites:** 3 credits of literature at the 200-level or above.  
**Cross Listing:** AFST 379/ENGL 379.
ENGL 385 Playwriting
Credits 3. 3 Lecture Hours.
The craft of writing plays and practical experience in writing plays of various lengths; structure, building of ideas into dramatic situations, use of dialogue and movement. 
Prerequisite: ENGL 235; junior or senior classification or approval of instructor.

ENGL 386 Creative Nonfiction
Credits 3. 3 Lecture Hours.
Practical study and application of literary nonfiction, the general audience essay, the memoir, and related nonfiction forms; with extensive workshop time and attention given to student writing, expert and peer review as well as readings from authors in the genre. 
Prerequisites: ENGL 235; junior or senior classification.

ENGL 390 Studies in British Literature
Credits 3. 3 Lecture Hours.
Exploration of a significant topic or period in British literature; features current faculty research on such topics as Victorian fantasy literature, social identity in medieval Britain and Ireland and children in film. May be repeated 1 time for credit. 
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification.

ENGL 391 Folklore, Literature, and World Cultures
Credits 3. 3 Lecture Hours.
Theories of folklore and vernacular culture; exploration of the relationship between oral literature and the forms of vernacular culture, including film, festival and dance. 
Prerequisites: Junior or senior classification.

ENGL 392/RELS 392 Studies in Literature, Religion and Culture
Credits 3. 3 Lecture Hours.
Exploration of literature treating significant religious topics in the context of cultural setting; features current faculty research on such topics as Tolkien and the making of myth, C.S. Lewis, texts and cultures of the Middle East and Victorian women writers and religion. May be repeated one time for credit. 
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification. 
Cross Listing: RELS 392/ENGL 392.

ENGL 393/AFST 393 Studies in Africana Literature and Culture
Credits 3. 3 Lecture Hours.
Literary movements, genres, groups of authors, topics or issues in the literature and culture of people of African descent. 
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification or approval of instructor. 
Cross Listing: AFST 393/ENGL 393.

ENGL 394 Studies in Genre
Credits 3. 3 Lecture Hours.
Theory and practice of a single genre including analysis of its history and development; features current faculty research on such topics as women standup comics, British short stories and Irish history on stage and screen. May be repeated once for credit. 
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification.

ENGL 396 Studies in American Literature
Credits 3. 3 Lecture Hours.
Exploration of a significant topic or period in American literature; features current faculty research on such topics as Asian-American women writers, American music and literature and American Gothic. 
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification.

ENGL 401 Contemporary Literary Theory
Credits 3. 3 Lecture Hours.
Exposure to the discourses of contemporary theory in engagement with other academic disciplines; study of major theoretical schools, debates, and critiques. 
Prerequisites: 3 credits of literature at the 300-level; junior or senior classification.

ENGL 403 Language and Gender
Credits 3. 3 Lecture Hours.
Language and gender from a sociolinguistic perspective; gender in the words and structures of language; gender representation and gendered language use in the media and a variety of sociocultural contexts; language use in intimate relationships; computer-mediated discourse; language, sexuality, and sexual orientation. 
Prerequisite: Junior or senior classification. 
Cross Listing: LING 403 and WGST 403.

ENGL 412 Studies in Shakespeare
Credits 3. 3 Lecture Hours.
Advanced study of a significant topic in Shakespeare. 
Prerequisites: 3 credits of literature at the 300-level; junior or senior classification.

ENGL 414 Milton
Credits 3. 3 Lecture Hours.
In-depth study of poetry and selected prose works of John Milton. 
Prerequisite: 3 credits of literature at the 300-level; junior or senior classification.

ENGL 415 Studies in a Major Author
Credits 3. 3 Lecture Hours.
Exploration of a major author as a vehicle for emphasizing intensive analysis, scholarship and literary criticism. 
Prerequisite: 3 credits of literature at 300-level; junior or senior classification.

ENGL 431 Chaucer
Credits 3. 3 Lecture Hours.
Intensive analysis of Chaucer’s works in Middle English, including engagement with published criticism and scholarship. 
Prerequisite: 3 credits of literature at 300-level; junior or senior classification.

ENGL 431 Chaucer
Credits 3. 3 Lecture Hours.
Intensive study of poetry and selected prose works of John Milton. 
Prerequisite: 3 credits of literature at the 300-level; junior or senior classification.

ENGL 460 Digital Authoring Practices
Credits 3. 3 Lecture Hours.
Analysis and practice of authoring in digital environments, including individual and collaborative approaches, audience concerns, theoretical, ethical and stylistic issues; environments and topics may include web design, content management system (CMS), text encoding, project management, usability, version tracking, content authoring and accessibility. 
Prerequisites: ENGL 210; junior or senior classification.
ENGL 461 Advanced Syntax and Rhetoric
Credits 3. 3 Lecture Hours.
Points of view toward language study; traditional syntax; points of view toward rhetoric; Christensen's rhetoric of the paragraph; analysis of written discourse.
Prerequisite: Senior classification or approval of instructor.

ENGL 462 Rhetoric in Cultural Context
Credits 3. 3 Lecture Hours.
Theories concerning the influence of socio-cultural context on expressive forms and how such forms are used to achieve social and communicative aims; analysis of examples of written, verbal, and visual rhetorics from various cultures illustrating the impact that expressive forms have on social life.
Prerequisites: ENGL 353, ENGL 354, or ENGL 355; junior or senior classification.

ENGL 474/WGST 474 Studies in Women Writers
Credits 3. 3 Lecture Hours.
A different topic each term examining women's writing through historical period, genre, cross-cultural study and/or feminist literary theory. May be repeated for credit.
Prerequisites: 3 credits of literature at the 300-level; junior or senior classification.
Cross Listing: WGST 474/ENGL 474.

ENGL 481 Senior Seminar
Credits 3. 3 Lecture Hours.
Capstone seminar on significant figures, movements or issues with special attention to methods and materials of scholarship.
Prerequisites: ENGL 303; senior classification.

ENGL 482 Health Humanities Senior Seminar
Credits 3. 3 Lecture Hours.
Capstone course; application of skills and knowledge acquired during health humanities concentration coursework; exposure to specialized methods of inquiry; development and execution of an individualized final project.
Prerequisites: HHUM 107; junior or senior classification.
Cross Listing: COMM 482, HIST 482, and HHUM 482.

ENGL 484 Internship
Credits 0 to 3. 0 to 3 Other Hours.
Directed internship in a public or private organization to provide students with on-the-job training and applied research experience appropriate to career objectives. May be taken three times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Approval of department head; junior or senior classification.

ENGL 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Readings selected for specific need of major or minor in English.

ENGL 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of English language and literature. May be repeated for credit.

ENGL 491 Research
Credits 0 to 3. 0 to 3 Lecture Hours.
Research conducted under the direction of faculty member in English. May be taken three times for credit.
Prerequisites: 12 credits of English, including 3 at 300-level; junior or senior classification and approval of instructor.

ENGL 497 Independent Honors Studies
Credits 0 to 3. 0 to 3 Other Hours.
Directed independent studies in the English language and English or American literature.
Prerequisites: Junior or senior classification either as Honors student or with overall GPR of 3.5 and letter of approval from head of student's major department. May be repeated for credit.

ENGR - Engineering (ENGR)

ENGR 101 Energy: Resources, Utilization and Importance to Society
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Introductory course about current and potential energy sources, the link between energy and wealth, and the consequences of action or inaction concerning energy and the environment.

ENGR 111 Foundations of Engineering I
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Introduction to the engineering profession, ethics, and disciplines; development of skills in teamwork, problem solving and design; other topics depending on the major include emphasis on computer applications and programming, visualization and CAD tools, introduction to electrical circuits, semiconductor devices, digital logic, communications and their application in systems; Newton's laws, unit conversions, statistics, computers, Excel; basic graphics skills; visualization and orthographic drawings.
Prerequisites: MATH 150 or MATH 151, or concurrent enrollment; admission to the College of Engineering.

ENGR 112 Foundations of Engineering II
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Continuation of ENGR 111. Topics include, depending on the major, emphasis on computer applications and programming and solids modeling using CAD tools or other software; fundamentals of engineering science; advanced graphic skills.
Prerequisite: ENGR 111; MATH 151 or concurrent enrollment; admission to the College of Engineering.

ENGR 181 Engineering Honors Seminar I
Credit 1. 1 Lecture Hour.
Survey of interdisciplinary topics related to the professional practice of engineering; seminars with practicing professionals in industry and government. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Certificate in engineering honors membership; freshman or sophomore classification.

ENGR 250 Principles in Engineering Leadership
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamentals of engineering leadership and business; organizational dynamics; self-awareness.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 111 and ENGR 112, or equivalents.

ENGR 260 Engineering Creativity
Credits 2. 2 Lecture Hours.
Designed to provide opportunities to gain knowledge and skills in the areas of creativity, innovation and design thinking through interdisciplinary team design projects and development of rough prototypes.
Prerequisites: ENGR 111 and ENGR 112, or concurrent enrollment.
ENGR 270 Engineering Projects in Community Service
Credit 1. 1 Lecture Hour.
Project course using team approach to engage students in open-ended community service projects involving non-profit agencies; includes project management, understanding the complete design process, awareness of the customer in engineering design, and the ability to communicate effectively. May be taken six times for credit.
Prerequisites: ENGR 111 or approval of instructor; freshman or sophomore classification in an engineering major.

ENGR 281 Engineering Honors Seminar I
Credit 1. 1 Lecture Hour.
Introduction to research and development in both university and industry settings. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Certificate in engineering honors membership; ENGR 181.

ENGR 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Special problems in any area of engineering.
Prerequisites: Freshman or sophomore classification; approval of department head.

ENGR 289 Special Topics in...
Credits 0 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

ENGR 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in the college of engineering. May be repeated three times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ENGR 299 Mid-Curriculum Professional Development
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes from the National Society of Professional Engineers' Engineering Body of Knowledge; documentation and self-assessment of learning experience at mid-curriculum point.
Prerequisite: ITDE major.

ENGR 301 College of Engineering Study Abroad
Credits 0 to 18. 0 to 18 Other Hours.
For students in approved programs abroad. May be repeated for credit.
Prerequisites: Admission to approved program; approval of study abroad coordinator.

ENGR 302 Credits 0.

ENGR 333 Project Management for Engineers
Credits 3. 3 Lecture Hours.
Basic project management for engineering; project development and economic justification; estimating; scheduling; network methods; critical path analysis; earned value management; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers.
Prerequisite: Junior or senior classification in the College of Engineering or biological and agricultural engineering or approval of instructor.

ENGR 350 Engineering Leadership and Business Fundamentals
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamental leadership and business topics relevant to engineering and technical careers; business model development; business strategy; leadership theory; empathy.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 250; junior or senior classification or approval by instructor.

ENGR 351 The Role of Engineering and Business in Society
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Exploration of engineering and business contributions to society; political, cultural, societal and economic forces' impact on engineering; using creativity and imagination to solve engineering and societal challenges.
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 350; junior or senior classification or approval by instructor.

ENGR 360 Engineering Entrepreneurial Mindsets
Credits 3. 3 Lecture Hours.
Entrepreneurial comprehension and competencies; introduction to entrepreneurial pathways as an engineering career; lean startup principles; business model canvas as applied to engineering design projects.
Prerequisites: ENGR 111 and ENGR 112.

ENGR 380 Seminar Series in Engineering Project Management
Credit 1. 1 Lecture Hour.
Presentations by practicing engineers and professionals addressing engineering project management process and practice; discussion forum to better understand the opportunities and challenges of engineering project management and the analytical tools and skills required to be successful. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: ENGR 333 or approval of instructor; junior or senior classification in the College of Engineering or biological and agricultural engineering (BAEN).

ENGR 381 Engineering Honors Seminar III
Credit 1. 1 Lecture Hour.
Exploration of research and development opportunities; university and industry research; research commercialization. To be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Certificate in engineering honors membership; ENGR 281.

ENGR 385 Problems for Co-Op Students
Credits 1 to 3. 1 to 3 Other Hours.
Special problems in engineering for cooperative education students. Problems related to student's work assignment culminating in a research paper. Three hours may be used as technical elective, and one additional hour may be used as free elective. A total of 4 hours may be used toward graduation.
Prerequisite: Approval of department head.

ENGR 401 Interdisciplinary Design
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Instruction and practice in the design process applied to an interdisciplinary design project including establish the customer need; determine requirements in terms of function (what) and performance (how well); develop alternative design concepts; perform trade-off studies among performance, cost and schedule; embodiment and detail design; iterate the above steps; major interdisciplinary design project.
Prerequisites: Senior classification and approval of instructor.
ENGR 402 Interdisciplinary Design II  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Product detail and design development process including case studies; may include project management, marketing considerations, manufacturing detailed design specifications; failure modes, applications of codes and standards, selection of design margins; product (component) development guidelines; intellectual property, product liability and ethical responsibility.  
Prerequisites: ENGR 401; junior or senior classification.

ENGR 410 Global Engineering Design  
Credits 0 to 3. 0 to 3 Lecture Hours.  
Intercultural models and their application to engineering design in diverse, multinational and multidisciplinary settings; engineering design project working in international teams of students, faculty and industry experts; applying engineering skills to the project; includes the study and application of intercultural models, global enterprise fundamentals and remote collaboration technologies; required for the International Engineering Certificate.  
Prerequisite: Junior or senior classification or approval of instructor.

ENGR 430 Fundamentals of Subsea Engineering  
Credits 3. 3 Lecture Hours.  
Orientation to subsea engineering fundamentals, including SURF (Subsea, Umbilicals/Controls, Risers, Flowlines) equipment and configurations; exposure to practical, industry focused problems; subsea equipment components; design considerations and design drivers; subsea production operations; integrity critical maintenance activities.  
Prerequisite: Junior or senior classification; enrolled in the College of Engineering or approval of instructor.

ENGR 450 Exploring Your Engineering Leadership Qualities and Perspective  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Exploration of personal leadership qualities and perspective; case studies in leadership in engineering enterprises; business etiquette and personal marketing.  
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 351; junior or senior classification or approval by instructor.

ENGR 451 Engineering Leadership Capstone  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Intersection of engineering, business, citizenship and leadership.  
Prerequisites: Acceptance into the Zachry Leadership Program; ENGR 450; junior or senior classification or approval by instructor.

ENGR 461 Engineering Product Lean Launch  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Exercises in the creation of an engineering-centric business using lean startup principles; customer and market validation; value proposition creation; minimum viable product (MVP) development; customer value chain discovery; communication skill training; development of a business model canvas for a student-developed engineering product business idea.  
Prerequisite: Junior or senior classification in the College of Engineering.

ENGR 462 Engineering Entrepreneurship Hour  
Credit 1. 1 Lecture Hour.  
Designed to engage with successful technology entrepreneurs from across the nation; learn about the characteristics of successful entrepreneurs and their strategies in launching and sustaining businesses on technology innovation; network with highly successful entrepreneurs and develop relations valuable to professional careers.  
Prerequisites: Junior or senior classification or approval of instructor.

ENGR 470 Engineering Projects in Community Service  
Credits 1 to 2. 1 to 2 Other Hours.  
Project course using team approach to engage students in open-ended community service projects involving non-profit agencies; includes project management, understanding the complete design process, awareness of the customer in engineering design, and the ability to communicate effectively. May be taken six times for credit.  
Prerequisites: ENGR 111 or approval of instructor; junior or senior classification in an engineering major.

ENGR 482/PHIL 482 Ethics and Engineering  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Development of techniques of moral analysis and their application to ethical problems encountered by engineers, such as professional employee rights and whistle blowing; environmental issues; ethical aspects of safety, risk and liability and conflicts of interest; emphasis on developing the capacity for independent ethical analysis of real and hypothetical cases.  
Prerequisite: Junior classification.  
Cross Listing: PHIL 482/ENGR 482.

ENGR 484 International Engineering Internship  
Credits 0 to 6. 0 to 6 Lecture Hours.  
International Engineering Internship.  
Prerequisite: Junior or senior classification.

ENGR 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Directed individual study of problems in any area of engineering. May be taken 3 times for credit.  
Prerequisites: Junior or senior classification; approval of the college.

ENGR 489 Special Topics in...  
Credits 0 to 4. 0 to 4 Lecture Hours. 0 to 6 Lab Hours.  
Selected topics in an identified field of engineering. May be repeated for credit.

ENGR 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in the College of Engineering. May be repeated 3 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.

ENST-Environmental Studies (ENST)

ENST 291 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of faculty member in environmental studies. May be repeated 2 times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

ENST 491 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of faculty member in environmental studies. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Freshman or sophomore classification and approval of instructor.
ENTC - Engineering Technology (ENTC)

ENTC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
I, II, S Selected topics in an identified area of engineering technology. May be repeated for credit.
Prerequisite: Approval of instructor.

ENTC 399 High Impact Experience
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes; documentation and self-assessment of learning experience at mid-curriculum point.
Prerequisites: Grade of C or better in ESET 350, IDIS 343 or MMET 376; approval of instructor.

ENTC 481 Seminar
Credit 1. 1 Lecture Hour.
Presentation of selected topics from current literature and related industrial operations in various technical areas; films showing practical application of manufacturing and industrial processes; lectures from industrial representatives.
Prerequisite: Senior classification.

ENTC 484 Professional Internship
Credit 1. 1 Lecture Hour.
Directed internship in a private firm, government agency/laboratory, or non-governmental organization to provide work and/or research experience related to the student's program and career objectives. May be taken two times for credit.
Prerequisites: Junior and senior classification and approval of internship agency and instructor.

ENTC 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Permits work in a special problem area on an individual basis with the intent of promoting independent reading, research and study; to supplement existing course offerings or subjects not presently covered.
Prerequisites: Senior classification and approval of instructor.

ENTC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of engineering technology.
Prerequisite: Approval of instructor.

ENTC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in the college of engineering. May be taken four times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

ENTO - Entomology (ENTO)

ENTO 201 General Entomology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Survey of the major classes of arthropods with special emphasis on species of economic or biological importance; general insect anatomy, physiology, metamorphosis and classification; survey of the biology of insect orders and major families using common injurious and beneficial species to relate material to production agriculture and the urban environment.

ENTO 208 Veterinary Entomology
Credits 2. 2 Lecture Hours.
Insects and their relatives causation of economic loss, impacts to well-being and transmission of disease pathogens to domestic and companion animals and wildlife as well as health and well-being of humans through occupational or recreational exposure; insect biology, economic importance and principles and methods of prevention and control.
Prerequisite: Co-enrollment in ENTO 209.

ENTO 209 Veterinary Entomology Laboratory
Credit 1. 2 Lab Hours.
Insects and their relatives causation of economic loss, impacts to well-being and transmission of disease pathogens to domestic and companion animals and wildlife, as well as health and well-being of humans through occupational or recreational exposure; laboratory emphasizes identification of major arthropod pests, use of microscopy and dissection equipment.
Prerequisite: Concurrent enrollment with ENTO 208.

ENTO 210 Global Public Health Entomology
Credits 3. 3 Lecture Hours.
Impacts of insects and insect-borne diseases on public health and well-being around the globe; insect biology, bloodfeeding, and transmission of human diseases; role of insect borne diseases on human history, socio-economic development, and public health infrastructure.
Prerequisite: Freshman or sophomore classification or approval of instructor.

ENTO 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study in entomology.
Prerequisites: Freshman or sophomore classification; approval of instructor and department head.

ENTO 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of entomology. May be repeated 2 times for credit.
Prerequisite: Approval of instructor.

ENTO 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in entomology. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ENTO 300/WFSC 300 Field Studies
Credits 3. 3 Other Hours.
Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations. Intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey.
Prerequisite: Junior or senior classification.
Cross Listing: WFSC 300/ENTO 300.

ENTO 301 Biodiversity and Biology of Insects
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to orders and most important families of insects; order-level morphology and family-level natural history; collection of insects identified to family level provides introduction to collection methods and specimen preparation.
Prerequisites: ENTO 201 or ENTO 208; 6 hours of biological sciences; junior or senior classification or approval of instructor.
ENTO 305 Evolution of Insect Structure  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
External morphology of insects; evolution of form and function.  
Prerequisite: 6 hours of biological sciences.

ENTO 306 Insect Physiology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Physiology of insects; structure and function of internal organ systems and their role in insect success.  
Prerequisite: ENTO 201 or ENTO 208; BIOL 111 and BIOL 112; CHEM 101/ CHEM 111 and CHEM 102/CHEM 112.  

ENTO 313 Biology of Insects  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Study of the orders and important families of insects and related arthropods, including general biology, relationships with plants and other animals, and characteristics used in identification.  
Prerequisite: 3 hours of biological science.

ENTO 315 Biotechnology and Society  
Credits 3. 3 Lecture Hours.  
Understanding the technology and principles of biotechnology; interpreting and communicating biotechnology reports of both popular press and peer-reviewed scientific articles.  
Prerequisite: Junior or senior classification or approval of instructor.

ENTO 320 Honey Bee Biology  
Credits 3. 3 Lecture Hours.  
Introduction of honey bee biology and beekeeping practices to science and non-science majors; honey bees as the model insect to introduce general principles of biology and entomology.  
Prerequisite: Junior or senior classification or approval of instructor.

ENTO 321 Beekeeping  
Credit 1. 3 Lab Hours.  
Basic Knowledge and techniques used in apiculture; tools and knowledge needed to keep bees responsibly and productively.  
Prerequisites: ENTO 320 or concurrent enrollment, junior or senior classification or approval of instructor.

ENTO 322 Insects and Human Society  
Credits 3. 3 Lecture Hours.  
Emphasis on the role insects have played in the development of human cultures; aspects include health, food production and storage, art, music and architecture; overview of historic, present day, and future roles insects will have on environmental movements (green societies), and in underdeveloped, developing and developed societies.  
Prerequisite: Junior or senior classification.

ENTO 401 Principles of Integrated Pest Management  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Integrated pest management (IPM) concepts, principles, development and application; IPM constitutes a series of pest control tactics and strategies toward more sustainable agriculture, natural resources, and urban and rural health and well-being.  
Prerequisite: ENTO 201 or ENTO 208.

ENTO 402 Field-Crop Insects  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Application of management strategies for insect/mite pests of small grains, corn, cotton, rice, sorghum, stored products and sunflower; nature and symptoms of damage, life history and habits of common pests. Laboratory consists of pest and pest damage identification supported by field trips.  
Prerequisite: ENTO 201 or equivalent.

ENTO 403 Urban Entomology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Biology, economic importance and control strategies for arthropod pests commonly invading households and commercial structures in urban environments; laboratory consists of urban pest identification and special presentations and demonstrations covering topics related to urban pest problems and their control. Offered in 2011-2012 academic year and alternating years thereafter.  
Prerequisite: ENTO 201 or equivalent or approval of instructor.

ENTO 423 Medical Entomology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Biologies, disease relationships, and control of insects and other arthropods parasitic on or in humans; aspect of the fields of clinical and preventative medicine; survey, collection and taxonomy of medically-important arthropods in laboratory sessions.  
Prerequisite: Junior or senior classification or approval of instructor.

ENTO 424 Insect Ecology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Provides basic ecological background with an applied interpretation, emphasizing influences of insect populations and communities on ecosystem processes that influence landscape structure, function and change.  
Prerequisites: ENTO 201 or equivalent; 3 hours of biological sciences; junior or senior classification or approval of instructor.

ENTO 425 Disease Ecology  
Credits 3. 3 Lecture Hours.  
Ecological interactions that influence the distribution and abundance of pathogens, vectors, and hosts ultimately determine the spread of disease; impacts of urbanization, climate change, and other human influenced environmental changes on disease dynamics; integration of disease ecology into pathogen and vector monitoring and comprehensive strategies to reduce disease occurrence.  
Prerequisite: Junior or senior classification, or approval of instructor.

ENTO 426/VIBS 426 Methods in Vector-Borne Disease Ecology  
Credits 3. 1 Lecture Hour. 5 Lab Hours.  
Methodological understanding of how vector-borne diseases are studied in the field and laboratory; hands-on exploration of the ecology disease systems in a one health framework; concepts of design, execution and presentation of research projects; outdoor field work and bio-safety level 2 laboratory.  
Prerequisites: Junior or senior classification and approval of instructor.  
Cross Listing: VIBS 426/ENTO 426.

ENTO 428 Insect Biotechnology  
Credits 3. 3 Lecture Hours.  
Applications of genetic engineering and biotechnology; specific problems dealing with insects and control of insect pests.  
Prerequisites: GENE 301 or GENE 315 or GENE 320/BIMS 320; junior or senior classification or approval of instructor.

ENTO 429 Insect Biotechnology Laboratory  
Credit 1. 3 Lab Hours.  
Basic technical experience in insect molecular biology and biotechnology, including genomic DNA isolation, PCR, cloning, sequencing and gene manipulation techniques; focus on insect applications for improvement of human health and agriculture.  
Prerequisites: ENTO 428; concurrent enrollment in ENTO 428; junior or senior classification or approval of instructor.
ENTO 431/FIVS 431 The Science of Forensic Entomology
Credits 3. 3 Lecture Hours.
Explores the science, methodology and technology employed to gather, preserve and present information about insects and other arthropods in such a manner that this information can be used in courts of law as evidence and testimony to help resolve issues of a criminal or civil nature.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: FIVS 431/ENTO 431.

ENTO 432/FIVS 432 Applied Forensic Entomology
Credit 1. 3 Lab Hours.
Laboratory-based course offering practical experience using scientific information, methodology, technology, and legal procedures inherent to the field of forensic entomology; emphasis on collecting, preserving, and identifying information as evidence and expert witness testimony in courts of law.
Prerequisites: Concurrent enrollment in ENTO 431/FIVS 431; junior or senior classification or approval of instructor.
Cross Listing: FIVS 432/ENTO 432.

ENTO 435 Case Studies in Problem Solving
Credits 3. 3 Lecture Hours.
Development of reasoning strategies by examining a variety of case studies, science and scientific methods; solving real-world problems as part of an investigative team.
Prerequisite: Senior classification or approval of instructor.

ENTO 450/WFSC 450 Caribbean Conservation
Credits 2. 6 Lab Hours.
Provide experience in and appreciation for diverse tropical habitats and the problems associated with conserving these habitats; design and conduct individual research projects on topics of their choice with approval from the instructors on project design and feasibility.
Prerequisites: Concurrent enrollment in ENTO 300/WFSC 300 and ENTO 451/WFSC 451; junior or senior classification.
Cross Listing: WFSC 450/ENTO 450.

ENTO 451/WFSC 451 Caribbean Research Seminar
Credit 1. 1 Other Hour.
Document research activities; keep a journal of activities and research methods during study abroad trips.
Prerequisites: Concurrent enrollment in ENTO 300 and 450; junior or senior classification.

ENTO 481 Seminar
Credit 1. 1 Lecture Hour.
Report of original investigations, current literature and special features of entomology.
Prerequisites: ENTO 201 or equivalent; junior or senior classification.

ENTO 482 Occupational and Professional Development
Credits 2. 2 Lecture Hours.
Organized instruction in written and oral communication; acquaint students with private and public-sector companies and agencies as well as leading professionals from these firms to reinforce academic instruction and prepare students for the transition to employment, graduate and professional schools.
Prerequisite: ENTO 201 or ENTO 208; or approval of instructor.

ENTO 484 Professional Internship
Credits 0 to 4. 0 to 4 Other Hours.
Independent study and supervised field experience related to a professional area of interest in entomology. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

ENTO 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Individual problems.
Prerequisites: ENTO 201 or equivalent; junior or senior classification; approval of instructor and department head.

ENTO 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of entomology. May be repeated for credit.
Prerequisite: Approval of instructor.

ENTO 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Faculty supervised research in entomology. May be taken two times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification or approval of instructor.

EPFB - Educ Psyc Field Based (EPFB)

EPFB 210 Family Involvement and Empowerment
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Field-based course that provides information and skills necessary to work with diverse families; addresses need for positive school-family collaboration and characteristics of families throughout the life cycle, the collaboration of educators with families through the special education process, and the provision of family services through community agencies.

EPFB 301 Teaching Skills I
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Study and development of skills focusing on collaboration, instruction, classroom management and professionalism in P-12 schools; field experience in general education settings. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Admission to professional phase of program.

EPFB 401 Teaching Skills II
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Study and development of skills focusing on individual P-12 students’ needs with emphasis on delivering complete lessons from a written plan to include Texas Essential Knowledge and Skills (TEKS) and Individualized Educational Program (IEP) objectives, incorporating modifications appropriately, setting behavioral expectations, and using questioning strategies for high level thinking; field experience in two special education settings. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Admission to professional phase of program.

EPFB 484 Field Experiences
Credits 0 to 6. 0 to 6 Other Hours.
University-supervised experience in a professional employment setting related to specializations in guidance and special education. May be repeated for credit up to 6 hours. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Admission to program; junior or senior classification.
EPSY - Educational Psychology (EPSY)

EPSY 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in educational psychology. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

EPSY 320 Child Development
Credits 3. 3 Lecture Hours.
Growth and development of the normal child from infancy to adolescence; implications of children's cognitive, language and psychosocial development for success in academic and social interactions.
Prerequisite: Junior or senior classification.

EPSY 321 Adolescent Development
Credits 3. 3 Lecture Hours.
Characteristics of adolescent growth and development emphasizing behavior within secondary school setting; influences of prior development; home, family and community; peer group, as these affect school adjustment and success.
Prerequisite: Junior or senior classification.

EPSY 430 Creativity Theories and Research
Credits 3. 3 Lecture Hours.
Theoretical base of creativity and the research methodologies used to study creativity.
Prerequisite: Junior or senior classification.

EPSY 431 Personal Creativity and Giftedness
Credits 3. 3 Lecture Hours.
Personal giftedness and creativity and its innerrelativity with development, relationships, and learning.
Prerequisite: Junior or senior classification.

EPSY 432 Creativity and Creative Problem Solving
Credits 3. 3 Lecture Hours.
Creativity research; historical background and application of the framework and tools of the Parnes/Osborn Creative Problem Solving Process.
Prerequisite: Junior or senior classification.

EPSY 433 Lateral Thinking
Credits 3. 3 Lecture Hours.
Edward deBono's theories and approach to creativity known as lateral thinking which is used throughout the world to increase creative thinking in individuals.
Prerequisite: Junior or senior classification.

EPSY 435 Educational Statistics
Credits 3. 3 Lecture Hours.
Statistical concepts and techniques and their application in behavioral sciences.
Prerequisite: Junior or senior classification.

EPSY 459 Practicum in Educating the Gifted and Talented
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Theory and strategies for instruction and guidance of the gifted and talented through a supervised experience in a laboratory setting with gifted and talented children and/or adolescents. May be taken two times for credit.
Prerequisites: Approval of department head and instructor; junior or senior classification.

EPSY 484 Field Experiences
Credits 0 to 6. 0 to 6 Other Hours.
University-supervised experience in a professional employment setting related to specializations in guidance and special education. May be repeated to 6 hours total.
Prerequisites: Approval of student's advisor and department head.

EPSY 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Research problems and readings in areas selected to supplement existing offerings; individual reports, oral and written, required.
Prerequisites: Junior or senior classification; approval of instructor.

EPSY 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of educational psychology. May be repeated for credit.
Prerequisite: Approval of instructor.

ESET - Electronic Sys Eng Tech (ESET)

ESET 210 Circuit Analysis
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Electric and magnetic principles of components used in DC and AC circuits; transient analysis; phasor analysis; Ohm's and Kirchhoff's laws, Thévenin's and Norton's theorems, mesh and nodal equations; measurement of current, voltage and waveforms with meters and oscilloscopes.
Prerequisite: MATH 151.

ESET 211 Power Systems and Circuit Applications
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Fundamentals of energy systems; power generation/distribution; motors/generators; AC power analysis; power factor correction; application of Thévenin's and Norton's Theorems, Superposition Theorem, and Mesh and Nodal analysis; resonant circuits; passive filters; nonsinusoidal circuits; pulse waveforms; measurements of AC circuits; circuit analysis using Multisim.
Prerequisites: ESET 210; MATH 152.

ESET 219 Digital Electronics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Survey of digital applications, number systems, digital logic devices and circuits, sequential logic.
ESET 250 Introduction to Electronics Technology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Hardware and software tools used in the electronics industry; software tools include LabVIEW and PSPICE; designed for anyone who needs knowledge, awareness and working familiarity of the software tools used in industry.

ESET 269 Embedded Systems Development in C
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to programming using the C programming language and embedded microcontroller systems; fundamental language syntax and semantics, concentration of the application to embedded systems.
Prerequisites: ESET 219 with a grade of C or better or concurrent enrollment; electronic systems engineering technology major; multidisciplinary engineering technology major.

ESET 315 Local-and-Metropolitan-Area Networks
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Design, operation, application and management of LANs and MANs; topologies, cabling systems, protocols, bridges, routers, hubs, switches, security; media and transport systems; Internet and TCP/IP topics including the protocol stack, router operation and addressing issues.
Prerequisites: ESET 219; electronic systems engineering technology major.

ESET 319 Engineering Leadership
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Exploration of Emotional Intelligence (EI), identification of personal EI competencies and areas for improvement, and development of these competencies and skills; determination of techniques to anticipate and manage our emotions, and to anticipate and work with the emotions of others.
Prerequisite: ENGL 104 with a grade of C or better; junior or senior classification.

ESET 329 Six Sigma and Applied Statistics
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Concepts of probability and statistics, mean, variance, Gaussian/uniform/Student/Weibull distributions, and their applications in electronics design, analysis, and troubleshooting; Six Sigma process and tools including Gauge R&R, test of hypotheses, analysis of variance, linear regression, response surface method, control chart, and design of experiments.
Prerequisites: Grade of C or better in ESET 210 and MATH 152; completion of ENGL 104, MATH 151, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

ESET 333 Product Development
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Process of product development to create an idea; development of a business plan; market research; voice of customer; managing resources; project management; identifying product partners; creating a unique product and/or company.
Prerequisite: ENGR 112 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

ESET 349 Microcontroller Architecture
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Microcontrollers including type of circuits and how they function; architecture of microcontrollers; instruction sets and how they are programmed.
Prerequisites: Grade of C or better in ESET 219 and ESET 269; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; electronic systems engineering technology.

ESET 350 Analog Electronics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Study of semiconductor devices including diodes, field effect transistors, bipolar junction transistors, and operational amplifiers; applications include signal conditioning, power supplies, active filters, discrete transistor amplifiers, and transistor switching/driver circuits.
Prerequisites: ESET 210 with a grade of C or better; CHEM 107 and CHEM 117 with a C or better; ENGL 104, MATH 151, MATH 152, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

ESET 352 Electronics Testing I
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Testing of electronic devices and systems; including test planning, test reporting, test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations; both circuit analysis (2/3) and circuit design (1/3) with several analog and mixed-signal systems.
Prerequisites: ENTC 329 and ESET 350 with a grade of C or better.

ESET 355 Electromagnetics and High Frequency Systems
Credits 4. 3 Lecture Hours. 3 Lab Hours.
High frequency concepts including topics in basic electromagnetics, transmission lines, antennas, and RF circuit design; applications including wireless communication systems, fiber optic systems, and high frequency PCB layout.
Prerequisites: Grade of C or better in ESET 211 and PHYS 208; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

ESET 359 Electronic Instrumentation
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Fundamentals of controls, measurement systems, sensors, sampling theorem, analog to digital and digital to analog conversions; signal conditioning; digital signal processing; computer-based data acquisition using graphical development environment; and digital communication protocols.
Prerequisites: Grade of C or better in ESET 349 and ESET 350; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

ESET 366 Communications Electronics
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamental communications concepts, frequency domain, analog and digital modulation, transmitter and receiver architectures, communication circuits including filters/oscillators/PLLs/amplifiers/mixers, fiber optics.
Prerequisites: Grade of C or better in ESET 350 or concurrent enrollment; junior or senior classification; or approval of instructor.
**ESET 369 Embedded Systems Software**
Credits 4. 3 Lecture Hours. 3 Lab Hours.
A study of the technical aspects of embedded computer software systems, with emphasis on embedded real-time systems, programming techniques and development methodologies.
Prerequisites: ESET 349 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.
Corequisite: ENTC 350.

**ESET 415 Advanced Network Systems and Security**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Practical network systems and security; topics include network design and protocol such as VLAN, HSRP, IP Routing, MPLS, and SAN; network security such as ACLs, TCP/IP security, IDS, and VPN; network service and management such as DHCP, DNS, NAT, SNMP, and MIB; and network verification and testing.
Prerequisites: ESET 315 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

**ESET 419 Engineering Technology Capstone I**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Project management tools for a formal technical proposal; addresses scope, schedule, risk, cost, milestones and deliverables; planning and initial design of prototype implemented in ESET 420; teams must have sponsor and technical advisor.
Prerequisites: Grade of C or better in ESET 319 or MXET 300, ESET 333 or MMET 361, and ESET 369.

**ESET 420 Engineering Technology Capstone II**
Credits 2. 6 Lab Hours.
Second semester course in capstone design sequence; focus on design implementation, testing, documentation, demonstration, and presentation of a fully functional prototype; professional design tools for schematic capture, printed circuit board layout and software development, integration and validation.
Prerequisites: Completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; senior classification in electronic systems engineering technology; final semester of technical coursework and successful completion of ESET 419 or approval of department.

**ESET 435 Data Communications**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Data communications concepts and techniques involving error detection and correction, data link control, switching, client-server computing, data compression, data security, internet protocol (IP), transmission control protocol (TCP), includes development of a data link control layer and a client server system utilizing socket by using C Programming Language in Visual C++ environment.
Prerequisites: ESET 315 and ESET 369 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

**ESET 444 Building Energy Management Systems**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Essential elements of energy management from understanding energy production to consumption; identification of the major components of energy management of buildings, energy audit to business (strategy), Heating Ventilating Air Conditioning (HVAC), control systems, economics (ROI) and engineering system integration.
Prerequisites: Junior or senior classification or approval of instructor.

**ESET 452 Electronics Testing II**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Advanced testing techniques of electronic devices and systems; study of advanced electronics test methodologies; emphasis on circuits containing analog to digital converters (ADCs) and digital to analog converters (DACs); device interface board design and data analysis; both circuit analysis (2/3) and circuit design (1/3) using industry grade state-of-the-art equipment.
Prerequisites: Grade of C or better in ESET 349 and ESET 352; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

**ESET 453 Validation and Verification**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Validation of semiconductor devices; differences between validation and production testing, extensive use of Altium for simulation and layout of circuits; use of Spotfire to analyze data acquired as part of validation process; focus on acquisition of valid data and concise presentation of data to stakeholders.
Prerequisites: Grade of C or better in ESET 352, junior or senior classification.

**ESET 455 Wireless Transmission Systems**
Credits 4. 3 Lecture Hours. 3 Lab Hours.
System engineering aspects of microwave, satellite and cellular communication systems; power budget calculations, propagation analysis, systems descriptions; CNR, CIR; review of modulations practical engineering considerations.
Prerequisites: ESET 355 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

**ESET 456 Embedded Sensors and Internet of Things (IoT) Systems**
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Integration of off-the-shelf sensors and embedded intelligence components to form data acquisition, monitoring and control of remote equipment and systems through wired and wireless networks; algorithm development and implementation in interrupt-driven and RTOS-based firmware environments; collection, reduction, analysis and information extraction of data from multiple edge devices using industry-standard cloud-based software environments.
Prerequisites: Grade of C or better in ESET 359 and ESET 369.

**ESET 462 Control Systems**
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Fundamentals of real-time closed-loop analog and digital control (the proportional, integral and derivative controller); distributed control systems, sensors, electronics, stepper and servo motors on a 16-bit microcontroller platform; design an autonomous vehicle; open industrial networks, such as Control Area Network (CAN) and DeviceNet technologies, will be discussed.
Prerequisites: Grade of C or better in ESET 359 and ESET 369; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.
ESET 469 Embedded Real Time Software Development  
Credits 3. 3 Lecture Hours.  
Survey of the operation and use of Real Time Kernels as the basis for embedded system firmware development; includes task operation, inter-task communications, synchronization, dynamic memory, multitask system design and defensive programming techniques; embedded RTOS applications.  
Prerequisites: Grade of C or better in ESET 349 or approval of instructor.

ESSM Ecosystem Science & Mgmt (ESSM)

ESSM 102 Introduction to Natural Resources and Ecosystem Management  
Credit 1. 1 Lecture Hour.  
Introduction to natural resources and ecosystem system approach to wildland management; survey of the field of natural resources and related industries.

ESSM 201 Exploring Ecosystem Science and Management  
Credit 1. 1 Lecture Hour.  
Exploration of knowledge, skills and abilities required for varied careers within ecosystem science and management; development of a professional portfolio and résumé; exploration of career options through team approach; conduct one service project.

ESSM 203 Forest Trees of North America  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
(FORE 1314) Forest Trees of North America. Taxonomy, phylogeny, and identification of the important forest trees of North America and their ecological and social uses and benefits.  
Prerequisites: BIOL 101, BIOL 107, BIOL 111 or BIOL 113 and BIOL 123 or equivalent.

ESSM 291 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in ecosystem science and management. May be repeated 2 times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

ESSM 300 Field Studies in Forest Ecosystems  
Credits 3. 1 Lecture Hour. 6 Lab Hours.  
Field-oriented focus on forest ecosystem science and management; problem-solve management questions through data collection and team-based research; investigate the relationships between landowner objectives, mensuration, silviculture, ecology, soils, and regeneration-focused harvesting systems; foster the development of student-faculty relationships; enhance professional knowledge and skills.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 301 Wildland Watershed Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Elements of watershed management and principles and practices of wildland management for protection, maintenance and improvement of water resource values.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 302 Wildland Plants of North America  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Familiarization with the distribution and economic value of important wildland plants in Texas and North America and fundamentals of sight identification of these plants; plant collection required.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 303 Agrostology  
Credits 3. 1 Lecture Hour. 6 Lab Hours.  
Classification and identification of grasses based on macro- and micromorphological variations of spikelets; interpretation of spikelet variation and use of diagnostic keys to identify important species of North America; a grass collection required.  
Prerequisites: Junior or senior classification or approval of instructor.

ESSM 304 Rangeland Plant Taxonomy  
Credits 4. 2 Lecture Hours. 6 Lab Hours.  
Interpretation of plant morphology for keying and identification of important flowering rangeland plants; vegetative and floral characters for important plant families including toxic compounds affecting domestic livestock. Plant collection required.  
Prerequisites: Junior or senior classification or approval of instructor.

ESSM 305 Watershed Analysis and Planning  
Credits 3. 3 Lecture Hours.  
Provide an integrated framework for watershed planning that addresses the related biophysical, social and economic issues; comprehensive in scope and approach giving students the tools and techniques for developing sound watershed management policy and practice; water issues, problems and regulations for Texas.  
Prerequisite: Junior or senior classification.

ESSM 306 Plant Functional Ecology and Adaptation  
Credits 3. 3 Lecture Hours.  
Investigation of physiological mechanisms influencing ecological patterns and processes, including plant acclimation and adaptation in contrasting habitats; abiotic controls on species productivity and distribution; underlying genetic and evolutionary mechanisms contributing to the occurrence of specific genotypes and phenotypes in unique environments.  
Prerequisites: RENR 205, any BIOL course, junior or senior classification or approval of instructor.

ESSM 307 Forest Protection  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Destructive agents in forestry as related to importance, identification, cause, extent of losses and protective measures.  
Prerequisites: RENR 205, AGEC 105 or equivalent, junior or senior classification or approval of instructor.

ESSM 308 Fundamentals of Environmental Decision-Making  
Credits 3. 3 Lecture Hours.  
Introduction to environmental issues in natural resources management; fundamental principles and methods for understanding biosocial interdependencies in complex environmental issues; use of computer-aided group decision-making techniques to develop cooperative strategies for resolving local or global environmental issues.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 309 Forest Ecology  
Credits 3. 3 Lecture Hours.  
Life history and general characteristics of trees; structure and function of forest ecosystems; fundamental principles of forest tree physiology and ecology applied to an analysis of tree growth in relation to environmental factors and present day forest management; global changes and forests.  
Prerequisite: Junior or senior classification or approval of instructor.
ESSM 310 Forest Tree Improvement and Regeneration
Credits 3. 3 Lecture Hours.
Genetic improvement or manipulation of forest trees through breeding or transformation; regeneration of forests including reproduction, nursery production, stand establishment, natural regeneration and problems affecting regeneration.
Prerequisites: BIOL 101, BIOL 113 or equivalent; junior or senior classification.

ESSM 311 Biogeochemistry and Global Change
Credits 3. 3 Lecture Hours.
Framework for understanding biogeochemical cycles, their significance at both global and ecosystem levels of organization, and their contemporary relevance to ecosystem science and management.
Prerequisites: RENR 205, RENR 215, any BIOL and/or CHEM course, junior or senior classification or approval of instructor.

ESSM 313 Vegetation Sampling Methods and Designs in Ecosystems
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Basis for vegetation sampling in ecosystems; methods for conducting sampling; selection of sampling unit appropriate for vegetation type; sampling statistics; mean comparisons; regression analysis; sampling design principles; development of sampling plan; presentation and interpretation of sampling data.
Prerequisites: Any MATH course satisfying university core curriculum, junior or senior classification or approval of instructor.

ESSM 314 Principles of Rangeland Management Around the World
Credits 3. 3 Lecture Hours.
Basic knowledge of world rangeland ecosystems, how these systems are managed in diverse cultural settings; principles of underlying ecological processes influenced by various land management practices; foster understanding of the values that people in different countries place on rangeland resources; use of these values to enhance geologically sustainable and socially acceptable rangeland management practices.
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 315 Rangeland Inventory and Monitoring
Credit 1. 2 Lab Hours.
Theory and methods to inventory rangeland vegetation; sampling design; analysis of inventory data; interpretation of sampling data; preparation of a technical report; presentation of inventory data in text, tables, and graphs using the style of the Rangeland Ecology and Management discipline.
Prerequisites: ESSM 313, junior or senior classification or approval of instructor.

ESSM 316 Range Ecology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Organization and distribution of rangeland ecosystems of the world, with emphasis on North America; community dynamics and functions stressed including biotic history, succession, disturbance regimes, competitive interactions, herbivory, energy flow and nutrient cycling; conservation of rangeland resources.
Prerequisites: RENR 205, RENR 215, ESSM 302, ESSM 314, ESSM 315, junior or senior classification or approval of instructor.

ESSM 317 Vegetation Management
Credits 3. 3 Lecture Hours.
Familiarization with practices that cause changes in rangeland vegetation composition for multiple uses; understanding of criteria for range improvement practices; comparison of expected responses of livestock forage production, watershed parameters and wildlife to vegetation changes following range improvements; systems concept for planning, analysis and implementation of range improvement practices.
Prerequisites: ESSM 314, junior or senior classification or approval of instructor.

ESSM 318 Coupled Social and Ecological Systems
Credits 3. 3 Lecture Hours.
Resilience-based stewardship of social-ecological systems; ecological concepts of resilience, sustainability, ecosystem services, and vulnerability; investigation of linkages among social and ecological system components; contribution to sustainability and provisioning of ecosystem services; evaluation of multiple knowledge sources as the basis for adaptive ecosystem management.
Prerequisites: RENR 205, AGEC 105 or equivalent, junior or senior classification or approval of instructor.

ESSM 319 Principles of Forestry
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Theory and practice of forestry in controlling forest establishment, composition, structure and growth; principles of natural and artificial regeneration; intermediate cultural operations; silvicultural systems; use and control of fire in forests; principles of sustainable stand management.
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 320 Ecosystem Restoration and Management
Credits 3. 3 Lecture Hours.
A basic conceptual framework for restoration ecology and ecological restoration; major principles of ecology related to practical problems confronting humankind, such as, environmental pollution and degradation, exotic species invasions, land use and management trade-offs and consequences; importance of biological diversity.
Prerequisite: RENR 205, RENR 215 or equivalent, junior or senior classification or approval of instructor.

ESSM 324 Forest Measurements
Credits 2. 4 Lab Hours.
Measures and measurement of the dimensions and attributes of forested areas including the diameters, heights, volume and biomass of trees within a well-defined area; tools used for forest measurement; the conduct of forest inventories; summary measures and reports of inventory results; remote sensing and related technologies that assist forest measurements.
Prerequisites: ESSM 313 and ESSM 319 or concurrent enrollment; junior or senior classification.
ESSM 351/RENR 405 Geographic Information Systems for Resource Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Geographic Information Systems (GIS) approach to solving spatial problems and managing natural resources, including the acquisition, management, manipulation, analysis, and mapping of spatial and non-spatial databases; identification of natural and relevant features from various data sources; integration of relevant technologies and data; extensive use of GIS software to solve real-world problems. Only one of the following will satisfy the requirements for a degree: ESSM 351/RENR 405, RENR 405/ESSM 351, ESSM 651, BAEN 651/ESSM 651 and RENR 651.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: RENR 405/ESSM 351.

ESSM 398 Interpretation of Aerial Photographs  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Identification and evaluation of natural and cultural features on aerial photographs; methods for extracting information concerning land use, vegetative cover, surface and structural features, urban/industrial patterns and archaeological sites.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 404 Changing Natural Resource Policy  
Credits 3. 3 Lecture Hours.  
Process through which environmental policies are changed; study theories of social and political change; teams use theories with their original research on environmental policy problems to create and implement plans for changing environmental policies in their own communities.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 405 Forest Resource Assessment and Management  
Credits 3. 1 Lecture Hour. 4 Lab Hours.  
Integration of biophysical, economic and social factors in forest resource analysis, management planning and decision making; applications of interdisciplinary knowledge and multiple-use principles to practical forest management problems.  
Prerequisite: Senior classification or approval of instructor.

ESSM 406 Natural Resources Policy  
Credits 3. 3 Lecture Hours.  
Natural resources and forest policy development in the United States and review of current issues in forest and related natural resource policy.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 415 Range Analysis and Management Planning  
Credits 3. 3 Lecture Hours.  
Basic concepts and theories of range management systems. Resource inventory, analysis and management planning.  
Prerequisites: AGEC 105 or ECON 202, ESSM 314, ESSM 317; junior or senior classification or approval of instructor.

ESSM 416 Fire Ecology and Natural Resource Management  
Credits 3. 3 Lecture Hours.  
Behavior and use of fire in the management of natural resources; principles underlying the role of weather, fuel characteristics and physical features of the environment related to the development and implementation of fire management plans.  
Prerequisite: RENR 205 or equivalent, junior or senior classification or approval of instructor.

ESSM 420 Ecological Restoration of Wetland and Riparian Systems  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
How wetland and riparian areas link terrestrial and aquatic systems and function hydrologically and ecologically within watersheds; integrated approaches for restoration of degraded wetland and riparian systems; improving water resources through vegetation management with a special interest in rangelands.  
Prerequisites: RENR 205, junior or senior classification or approval of instructor.

ESSM 430 Advanced Restoration Ecology  
Credits 3. 3 Lecture Hours.  
A dynamic discipline relying heavily on the fundamentals of ecology; practice translating and communicating key ecological concepts to advanced case studies in ecological restoration; enhance skills for professional applications.  
Prerequisites: RENR 205, ESSM 320, ESSM 420; junior or senior classification.

ESSM 440 Wetland Delineation  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Covers the application of the 1987 Wetland Delineation Manual in use by the Army Corps of Engineers (CORPS); field indicators of hydric vegetation; hydric soils, wetland hydrology, methods for making jurisdictional determinations in non-disturbed and disturbed areas, recognition of problem wetlands and technical guidelines for wetlands.  
Prerequisite: Junior or senior classification.

ESSM 444 Remote Sensing of the Environment  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Principles and techniques necessary for applying remote sensing to diverse issues in studying and mapping land uses and land covers of the terrestrial environment; emphasizes a hands-on learning approach with theoretical foundations and applications in both aerial and satellite remote sensing, using optical and lidar datasets.  
Prerequisite: Junior or senior classification or approval of instructor.

ESSM 445 Programming for Spatial Data Applications  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Programming for spatial data applications in general and for natural resources application in particular; basic programming concepts and constructs for the creation and manipulation of spatial data; automating of processes; programming behind spreadsheet and GIS applications.  
Prerequisites: ESSM 351/RENR 405 or equivalent, junior or senior classification or approval of instructor.

ESSM 461 Spatial Databases for Data Storage, Manipulation and Analysis  
Credits 3. 1 Lecture Hour. 4 Lab Hours.  
Relational databases and advanced geodatabase capabilities; types of geodatabases; Structured Query Language including join-types and subqueries; ArcGIS Desktop Advanced.  
Prerequisites: ESSM 459; junior or senior classification or approval of instructor.
ESSM 462/GE DG 462 Advanced GIS Analysis for Natural Resource Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Advanced topics in Geographic Information Systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects, particularly with habitat suitability models; field and lab use of Global Positioning Systems (GPS); internet-based GIS modeling.  
Prerequisites: ESSM 351/RENR 405 or AGSM 461/SPSC 461 or equivalent or approval of instructor; junior or senior classification.  
Cross Listing: GEOG 462/ESSM 462.

ESSM 464 Spatial Project Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Integration of key components of spatial project management to ensure a successful project implementation using life-cycle methodology and spatial project management; strategy and planning, requirements analysis, design, development, deployment, and operations and maintenance; term project working with real world data to develop and manage a spatial project for practical applications.  
Prerequisites: ESSM 351/RENR 405 and ESSM 444, junior or senior classification or approval of instructor.

ESSM 480 Plant Identification and Undergraduate Range Management Exam Team Competitions  
Credits 0 to 3. 0 to 3 Other Hours.  
Knowledge of plants morphology, identification and distribution for the profession of range management; knowledge of range management across the world; weekly tests to train on plant and range management knowledge. May be repeated for credit.  
Prerequisites: Senior classification in ESSM degree program.

ESSM 481 Senior Seminar  
Credit 1. 1 Lecture Hour.  
Completion of professional e-portfolio, résumé and job application; exploration of job search, application, and interview; discipline competency exams; program evaluation.  
Prerequisite: Senior classification in ESSM degree program.

ESSM 484 Internship  
Credits 0 to 4. 0 to 4 Other Hours.  
Supervised experience program conducted in the student's area of specialization.  
Prerequisite: Approval of student's advisor.

ESSM 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Individual study and research upon a selected range problem.  
Prerequisite: Approval of student's advisor.

ESSM 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of rangeland ecology and management. May be repeated for credit.  
Prerequisite: Approval of instructor.

ESSM 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in ecosystem science and management. May be repeated for credit.  
Prerequisites: Junior or senior classification and approval of instructor.

EURO - European Studies (EURO)

EURO 220 Contemporary French Culture  
Credit 1. 1 Lecture Hour.  
Cultural and practical orientation for students participating in the summer study abroad programs in France; brief introduction to contemporary social and cultural institutions; discussions of French university system; oral reports and final paper; readings and discussion in English and French.  
Prerequisite: FREN 101 or equivalent.

EURO 223/FREN 223 French Culture and Society in French Literary Masterpieces in Translation  
Credits 3. 3 Lecture Hours.  
Analysis and understanding of French culture and contemporary society through the study of masterpieces of French literature including novels, plays, short stories and films.  
Cross Listing: FREN 223/EURO 223.

EURO 230 Contemporary German Culture  
Credit 1. 1 Lecture Hour.  
Cultural and practical orientation for students participating in the summer study abroad programs in Germany; brief introduction to contemporary social and cultural institutions; discussions of German university system; oral reports and final paper; readings and discussion in English and German.  
Prerequisite: GERM 101 or equivalent.

EURO 232 Exploratory German Language and Culture  
Credits 3. 3 Lecture Hours.  
Introduction to the fundamentals of German language and culture; immersion in a European culture; acquisition of skills and insights necessary to experience life in Germany; study of comparisons and contrasts between German and North American culture.

EURO 237 The German Roaring '20s  
Credits 3. 3 Lecture Hours.  
The German Roaring '20s. The culture of Weimar Germany as a paradigm for European modernity; examination of political and technological modernization through analysis of literary and artistic forms and philosophical and social ideas; taught in English.

EURO 240 Contemporary Russian Culture  
Credit 1. 1 Lecture Hour.  
Cultural and practical orientation for students participating in the summer study abroad programs in Russia; brief introduction to contemporary social and cultural institutions; discussions of Russian university system; oral reports and final paper; readings and discussion in English and Russian.  
Prerequisite: RUSS 101 or equivalent.

EURO 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Individual supervision of readings or assigned projects in European studies selected for each student individually.  
Prerequisites: Approval of instructor and department head.

EURO 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of European studies. May be repeated for credit.  
Prerequisite: Approval of instructor.
EURO 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in European languages and cultures. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

EURO 311 Diversity Issues in Classical Studies
Credits 3. 3 Lecture Hours.
Study of diversity, “otherness,” and tolerance in Greco-Roman antiquity; and the effects of intolerance on modern classical studies.
Prerequisites: ENGL 104 and junior or senior classification.

EURO 323 Immigration and Ethnicity in Contemporary France
Credits 3. 3 Lecture Hours.
Immigration and ethnic groups in contemporary France, their effects on national identity and politics, and their cultural representations.
Prerequisite: ENGL 104 and junior or senior classification.

EURO 405/FILM 405 European Cinema
Credits 3. 3 Lecture Hours.
Exploration of key movements in European cinema from 1895 to the present, including both national cinematic traditions, such as Italian Neorealism or French New Wave, and international trends such as Formalism, Expressionism, or Auteurism.
Prerequisite: FILM 251/ENGL 251 or approval of instructor.
Cross Listing: FILM 405/EURO 405.

EURO 406/FILM 406 Propaganda and Dissidence
Credits 3. 3 Lecture Hours.
Use of film as a medium to promote political ideology, government propaganda, political dissidence, and subversion, with focus on Europe.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: FILM 406/EURO 406.

EURO 432/GERM 432 Music in German Culture
Credits 3. 3 Lecture Hours.
Examination of the role of music in German cultural and national self-definition from the 18th century to the present; the political and ideological role of music; study of genres and media including opera, art song, Singspiel, protest songs and film; taught in English.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: GERM 432/EURO 432.

EURO 436 German Fairy Tales
Credits 3. 3 Lecture Hours.
Introduction to and study of fairy tales and children's literature through German tradition in these forms; reception of fairy tales through adaptation and modernization; taught in English.
Prerequisite: Junior or senior classification, or approval of instructor.

EURO 437/GERM 437 German Romanticism: Literature, Theory, Philosophy
Credits 3. 3 Lecture Hours.
From Goethe's "Faust" to the romantic exaltation of poetry; influence of the romantic movement on European literary theory and philosophy; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: GERM 437.

EURO 441/ RUSS 441 The Russian Novel I: Tolstoy and Dostoevsky
Credits 3. 3 Lecture Hours.
Study of the major works of Tolstoy and Dostoevsky; discussion of the literary nature and purpose of novels, especially in the context of Russian culture; taught in English.
Prerequisite: 3 hours of English literature at 200 level or above, or approval of instructor.
Cross Listing: RUSS 441/EURO 441.

EURO 442/ RUSS 442 The Russian Novel II: The Twentieth Century
Credits 3. 3 Lecture Hours.
Study of major Russian novels from ca. 1900 to the end of Stalinism; exploration of topics relevant to Russia’s experience in the 20th century; taught in English.
Prerequisite: 3 hours of English literature at 200 level or above, or approval of instructor.
Cross Listing: RUSS 442/EURO 442.

EURO 443/ RUSS 443 Contemporary Russian Prose
Credits 3. 3 Lecture Hours.
Study of Russian and Soviet 20th-century prose literature, with emphasis on post-Stalinist and post-glasnost writers; taught in English.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: RUSS 443/EURO 443.

EURO 444/ RUSS 444 Russian Drama
Credits 3. 3 Lecture Hours.
Introduction to the masterpieces of Russian drama from the 19th century to the present; includes such authors as Pushkin, Chekhov, Gorky, Arbuzov, Rozov and Petrushevskaya; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: RUSS 444/EURO 444.

EURO 446/ RUSS 446 Russian Artistic Culture I: Beginnings to 1900
Credits 3. 3 Lecture Hours.
Masterpieces of Russian art, including architecture, dance, theater, music, and literature, from its beginnings until ca. 1900; taught in English.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: RUSS 446/EURO 446.

EURO 447/ RUSS 447 Russian Artistic Culture II: 1890 to Present
Credits 3. 3 Lecture Hours.
Masterpieces of Russian art, including architecture, dance, theater, music, film, and literature, from ca. 1890 to the present; taught in English.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: RUSS 447/EURO 447.

EURO 451/ ITAL 451 Introduction to Italian Culture
Credits 3. 3 Lecture Hours.
Introduction to the culture of the Italian Peninsula, from Middle Ages to present; study of major works of literature, political science, visual arts, music and cinema, to set Italy’s culture in its social and historical context; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.

EURO 453/ ITAL 453 Italian Literature
Credits 3. 3 Lecture Hours.
Survey of Italian literature; focus on literary portrayal of reality in modern and contemporary Italian culture, the dialogue with the classical tradition, and literature’s potential to affect and be affected by social critique; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: ITAL 453/EURO 453.
EURO 454/ITAL 454 Italian Drama
Credits 3. 3 Lecture Hours.
Study of Italian dramatic literature from the origins of Italian theater to the contemporary stage; analysis of the link between theater, opera, and film; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: ITAL 454/EURO 454.

EURO 456/ITAL 456 Contemporary Italy
Credits 3. 3 Lecture Hours.
Examination of changes in Italian society and culture since World War II, with focus on their narration and interpretation by representative authors and filmmakers, and on multicultural literary production in present-day Italy; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: ITAL 456/EURO 456.

EURO 457/ITAL 457 Italian Urban Cultures
Credits 3. 3 Lecture Hours.
Italian cities in a social, historical, transnational and global perspective; geopolitical and eco-literary theory; literature, visual arts, music and cinema; taught in English.
Prerequisites: ITAL 201; junior or senior classification or approval of instructor.
Cross Listing: ITAL 457/EURO 457.

EURO 484 Internship
Credits 1 to 3. 1 to 3 Other Hours.
Directed Internship in a private firm or public agency to provide experience and learning appropriate to the student’s degree program and career objectives. Must be taken on a satisfactory/unsatisfactory basis. May be taken two times for credit.
Prerequisite: Junior or senior classification.

EURO 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects in European studies, selected for each student individually.
Prerequisite: Approval of instructor and department head.

EURO 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of film studies. May be repeated for credit.
Prerequisite: Approval of instructor.

EURO 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in European languages and cultures. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of department head.

EURO 499 History of Film
Credits 3. 3 Lecture Hours.
Historical development of major periods, movements and styles, including several different national cinemas.

FILM 215 Global Cinema
Credits 3. 3 Lecture Hours.
History and theory of global cinema; historical, socio-political, national and international contexts of film production and reception; transnational film.
Cross Listing: INTS 215.

FILM 251/ENGL 251 Introduction to Film Analysis
Credits 3. 3 Lecture Hours.
Fundamental aspects of film analysis and criticism.
Cross Listing: ENGL 251/FILM 251.

FILM 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Selected fields of film studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit.
Prerequisite: Approval of director of film.

FILM 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Special topics in an identified area of film studies.

FILM 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in film.
Prerequisites: FILM 251/ENGL 251 or FILM 299 and freshman or sophomore classification and approval of instructor.

FILM 299 History of Film
Credits 3. 3 Lecture Hours.
Historical development of major periods, movements and styles, including several different national cinemas.

FILM 343/WGST 343 Sex, Gender and Cinema
Credits 3. 3 Lecture Hours.
Prerequisites: 3 hours in FILM or WGST; junior or senior classification or approval of instructor.
Cross Listing: WGST 343/FILM 343.

FILM 345/COMM 345 Media Industries
Credits 3. 3 Lecture Hours.
Survey of the business organization, economic structures and processes and regulations of the media industry.
Prerequisites: Any lower-division COMM course, or junior classification, or approval of instructor.
Cross Listing: COMM 345/FILM 345.

FILM 349 Documentary Cinema
Credits 3. 3 Lecture Hours.
History and theory of documentary cinema; examination of documentary film’s ability to both reflect and shape the history of its time. May be taken two times for credit.
Prerequisite: Junior or senior classification, or approval of instructor.
FILM 351/ENGL 351 Advanced Film
Credits 3. 3 Lecture Hours.
A different film topic each term; sample topics include major directors, historical periods, fiction into film, film genres. May be repeated for credit. 
Prerequisite: ENGL 251/FILM 251 or FILM 251/ENGL 251 or FILM 299 or approval of instructor; junior or senior classification. 
Cross Listing: ENGL 351/FILM 351.

FILM 356/ENGL 356 Literature and Film
Credits 3. 3 Lecture Hours.
Novels and films based on them; writers and filmmakers such as Virginia Woolf, John Steinbeck, John Ford, Sally Potter, John Huston, Charlotte Bronte and Peter Bogdanovich. 
Prerequisites: 3 credits of literature at the 200-level or above; junior or senior classification or approval of instructor. 
Cross Listing: ENGL 356/FILM 356.

FILM 376/PHIL 376 Philosophy, Film and Evil
Credits 3. 3 Lecture Hours.
Application of philosophical methods and analyses to the medium of film; survey of various depictions and treatments of evil within the genre of science fiction; investigation of depictions and treatments of evil arising from consideration of human encounters with alien others. 
Prerequisite: Junior or senior classification. 
Cross Listing: PHIL 376/FILM 376.

FILM 394 Studies in Film Genre
Credits 3. 3 Lecture Hours.
Study of a specific film genre, such as Western, Gangster, Mystery, Science Fiction; genre varies each time course is taught; movies are screened and analyzed along with assigned readings that explore characteristics of the genre and its cultural importance. May be repeated for credit. 
Prerequisite: FILM 251/ENGL 251 or ENGL 251/FILM 251.

FILM 398/AFST 398 Africana Cinema
Credits 3. 3 Lecture Hours.
Overview of African cinema; historical survey of cinema from Africa and the African Diaspora; introducing films produced in several geographical regions and reflecting different filmmaking traditions. May be taken two times for credit. 
Prerequisite: Junior or senior classification or approval of instructor. 
Cross Listing: AFST 398/FILM 398.

FILM 401 National Cinema History
Credits 3. 3 Lecture Hours.
Cinema History of a given film-producing nation other than the United States, such as Japanese Film, Swedish Film, South African Film. May be taken three times for credit. 
Prerequisites: FILM 299; junior or senior classification.

FILM 402 Intermedia Performance
Credits 3. 3 Lecture Hours.
Study of theory, history, literature and techniques of intermedia composition and design for film, theatre, dance, interactive media, and other forms of performance; examination of the collaborative creative process; projects in interdisciplinary performance. 
Prerequisites: Junior or senior classification and MUSC 316, PERF 202, or approval of instructor. 
Cross Listing: MUSC 402 and PERF 402.

FILM 405/EURO 405 European Cinema
Credits 3. 3 Lecture Hours.
Exploration of key movements in European cinema from 1895 to the present, including both national cinematic traditions, such as Italian Neorealism or French New Wave, and international trends such as Formalism, Expressionism, or Auteurism. 
Prerequisite: FILM 251/ENGL 251 or approval of instructor. 
Cross Listing: EURO 405/FILM 405.

FILM 406/EURO 406 Propaganda and Dissidence
Credits 3. 3 Lecture Hours.
Use of film as a medium to promote political ideology, government propaganda, political dissidence, and subversion, with focus on Europe. 
Prerequisite: Junior or senior classification or approval of instructor. 
Cross Listing: EURO 406/FILM 406.

FILM 415/CLAS 415 The Ancient World in Film
Credits 3. 3 Lecture Hours.
Study of modern films as they relate to ancient literary texts that inspired them or with which they share common themes; relationship between Greek epic, tragedy, and comedy and their cinematic adaptations; treatment of Rome as an idea or ideal in the work of both ancient Romans and modern filmmakers. 
Prerequisite: Junior or senior classification, or approval of instructor. 
Cross Listing: CLAS 415/FILM 415.

FILM 417 Film Authorship
Credits 3. 3 Lecture Hours.
Exploration of a major film author (director, screenwriter or writer/director) as a vehicle for emphasizing intensive analysis, scholarship, film criticism and the question of individual authorship with the collective enterprise of filmmaking. 
Prerequisites: 3 credits of Film Studies at the 300 or 400 level or approval of instructor; junior or senior classification.

FILM 425/FREN 425 French Film
Credits 3. 3 Lecture Hours.
Overview of French cinema from its origins to the present; interpretation of French cultural history and politics through film; taught in English. 
Prerequisite: Junior or senior classification, or approval of instructor. 
Cross Listing: FREN 425/FILM 425.

FILM 435/GERM 435 German Film
Credits 3. 3 Lecture Hours.
Consideration and analysis of major works and directors of German Film; interpretation of culture through film; relationship of film to history, literature, and other arts; taught in English. May be repeated for credit. 
Prerequisite: Junior or senior classification, or approval of instructor. 
Cross Listing: GERM 435/FILM 435.

FILM 445/COMM 435 Rhetoric of Television and Film
Credits 3. 3 Lecture Hours.
Critical analysis of television and film; close readings of such mediated texts; special attention to writing television and film criticism. 
Prerequisite: Junior or senior classification. 
Cross Listing: COMM 435/FILM 445.

FILM 455/ITAL 455 Italian Cinema
Credits 3. 3 Lecture Hours.
Survey of Italian cinema from Neorealism to the present; taught in English. 
Prerequisites: Junior or senior classification, or approval of instructor. 
Cross Listing: ITAL 455/FILM 455.
FILM 465/CHIN 465 Chinese Film  
Credits 3. 3 Lecture Hours.  
Consideration and analysis of major works and directors of Chinese film; interpretation of culture through film; relationship of film to history, literature and other arts; taught in English. May be taken two times for credit.  
Prerequisite: Junior of senior classification or approval of instructor.  

FILM 481 Seminar in Film Studies  
Credits 3. 3 Lecture Hours.  
Seminar on a figure, theme, style, movement or theory in film studies, with practice in the methods of research in film studies, culminating in a substantial research paper. Open to seniors enrolled in the interdisciplinary minor in film studies and to others with approval of the Coordinator of Film Studies. May be taken two times for credit.  
Prerequisite: 9 hours in film studies courses including FILM 299.

FILM 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Selected fields of film studies not covered in depth by other courses. Reports and extensive reading required. May be repeated for credit.  
Prerequisite: Approval of director of film.

FILM 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Special topics in an identified area of film studies.  
Prerequisite: Junior or senior classification or approval of instructor.

FILM 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of faculty member in film.  
Prerequisites: FILM 251/ENGL 251 or FILM 299 and junior or senior classification and approval of instructor.

FINC - Finance (FINC)  

FINC 201 Personal Finance  
Credits 3. 3 Lecture Hours.  
(BUSI 1307, HECO 1307) Personal Finance. Financial management problems of the individual consumer; budgeting, insurance, saving and investing, and home financing. May not be used as a finance elective.

FINC 210 Opportunities in Finance I  
Credit 1. 1 Lecture Hour.  
Introduction to major career paths in finance and assessment of students' aptitudes and interests with respect to these career paths.  
Prerequisite: Freshman or sophomore classification in Mays Business School.

FINC 211 Opportunities in Finance II  
Credit 1. 1 Lecture Hour.  
Exploration of specific career competencies in various financial workplaces via lectures, practitioner presentations, and field experiences.  
Prerequisites: FINC 210 and approval of instructor.

FINC 267 Introduction to Securities and Commodities Trading  
Credit 1. 1 Lecture Hour.  
Introduction to financial markets and the instruments that trade in them; describes how financial markets operate; compare and contrast a wide variety of common financial instruments, including debt, equity, derivatives and commodities; basic functions of real-world data sources (especially Bloomberg and the Wall Street Journal); and career paths in the field of finance.  
Prerequisite: Freshman or sophomore classification in business.

FINC 285 Directed Studies  
Credits 0 to 6. 0 to 6 Other Hours.  
Directed study of selected problems in the area of finance not covered in other courses. May be taken five times.  
Prerequisites: FINC 341 or concurrent enrollment and approval of department head.

FINC 341 Business Finance  
Credits 3. 3 Lecture Hours.  
Financial practices and financial management of modern business corporations; cash flow, planning, procurement of funds, management of long-term funds and working capital.  
Prerequisite: Admission to upper division in Mays Business School.

FINC 350 Ethics in Financial Decision-Making  
Credit 1. 1 Lecture Hour.  
Recognition and avoidance of breaches of fiduciary duty in the financial workplace; integration of classical ethical codes of conduct into professional decision-making; analysis and application of practitioner standards of conduct.  
Prerequisites: Admission to upper division in Mays Business School; FINC majors only.

FINC 351 Investment Analysis  
Credits 3. 3 Lecture Hours.  
Operation and functions of the organized security exchanges, fundamental security analysis and technical market analysis.  
Prerequisites: ACCT 327 or concurrent enrollment; FINC 210; FINC 341 with a grade of C or better; SCMT 303 or concurrent enrollment, or AP STAT 301 or AP STAT 302 or AP STAT 303.

FINC 361 Managerial Finance I  
Credits 3. 3 Lecture Hours.  
Managerial problems of financial managers; financial analysis, current asset management, capital budgeting and capital structure.  
Prerequisites: ACCT 327 or concurrent enrollment; FINC 210, FINC 341 with a grade of C or better; SCMT 303 or concurrent enrollment, or AP STAT 301 or AP STAT 302 or AP STAT 303.

FINC 368 Trade Floor Dynamics  
Credits 3. 3 Lecture Hours.  
Analysis of trade floor activities and behaviors; organizational and process structure of trade floors; characteristics of trade floors that vary by type of asset traded, trading objectives and contract structure; analysis of operational issues including credit constraints, trade strategies, and regulatory compliance.  
Prerequisites: FINC 341 or concurrent enrollment; admission to Trading, Risk and Investment Program (TRIP).

FINC 371 Real Estate Decision-Making  
Credits 3. 3 Lecture Hours.  
Legal, physical and economic characteristics of real estate; overview of real estate market analysis, real estate valuation procedures and real estate production, marketing and financing methods.  
Prerequisite: FINC 341 or concurrent enrollment in FINC 341.

FINC 381 Money and Capital Markets  
Credits 3. 3 Lecture Hours.  
Role of finance and financial institutions in the money and capital markets in the U.S. including supply of and demand for funds, interest rates and flow of funds analysis.  
Prerequisite: FINC 341 with a grade of C or better.
FINC 409 Survey of Finance Principles
Credits 3. 3 Lecture Hours.
Finance survey for non-business majors; financial markets, the investment banking process, interest rates, financial intermediaries and the banking system, financial instruments, time value of money concepts, security valuation and selection, and international finance. May not be used to satisfy degree requirements for majors in business or agribusiness.
Prerequisites: Junior or senior classification; for students other than business and agribusiness.

FINC 422 Applied Investment Analysis
Credits 3. 3 Lecture Hours.
Theoretical and analytical developments in security selection and portfolio management; includes macroeconomic analysis, portfolio theory, and portfolio performance evaluation; concepts applied to the allocation of investments in a student-managed equity portfolio.
Prerequisites: Approval of instructor; FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 423 Options and Financial Futures
Credits 3. 3 Lecture Hours.
Valuation of options and financial futures; risk management and hedging applications using options and financial futures; primary focus on stock options, index options, stock index futures, interest rate futures, foreign exchange futures and futures options.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 424 Trading Risk Management
Credits 3. 3 Lecture Hours.
Mid-office risk management strategies using the energy markets as a focus; develops understanding of commodity market behavior, use of forwards and options for risk management, risk management reporting, Greeks and simulation-based VaR analysis.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 425 Active Portfolio Management
Credits 3. 3 Lecture Hours.
Analysis of investment tactics designed to earn abnormal returns; identification and evaluation of active strategies that exploit capital market anomalies and market inefficiencies; portfolio structuring, stock and sector selection, performance measurement, attribution analysis and benchmarks in inefficient markets.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 426 Trading Markets
Credits 3. 3 Lecture Hours.
Issues related to securities trading and securities markets; why and how people trade; the operation, structure and regulation of securities markets; focus on equity markets; comparisons to the markets for derivatives and other securities.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 427 Titans of Investing
Credits 3. 3 Lecture Hours.
Readings from the most influential theorists and practitioners of 20th and 21st century investing; case studies and portfolio sector exercises in an institutional context, based on detailed assessment of global investment risks.
Prerequisites: FINC 341 or FINC 409, or concurrent enrollment in either course; approval of instructor.

FINC 428 Fixed Income Analysis
Credits 3. 3 Lecture Hours.
Characteristics of fixed income securities including Treasury issues, federal agency issues, corporate and municipal bonds, mortgage-backed and asset-backed securities; institutional features fixed income markets; risks of bond investing; fixed income valuation; term structure; trade strategies; modeling and assessing credit risks; hedging with fixed income derivatives.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 435 Managerial Finance II
Credits 3. 3 Lecture Hours.
Case studies in the administration of the financial affairs of business enterprises; working capital management, capital budgeting, capital structure, and mergers and acquisitions.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 443 Valuation
Credits 3. 3 Lecture Hours.
Theory and application of various approaches to corporate valuation; measuring and managing the value of companies; principles of value creation, fundamental valuation methodology; application of value creation principles to managerial problems; special cases and complex valuation issues.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 444 Behavioral Finance
Credits 3. 3 Lecture Hours.
Psychological and sociological aspects of financial decision making for individuals, institutions, and corporations; impacts of psychological factors on the financial markets, including anomalies in asset prices and stock market bubbles and crashes.
Prerequisites: FINC 351 and FINC 361.

FINC 445/IBUS 446 International Finance
Credits 3. 3 Lecture Hours.
International business transactions, balance of payments and exchange rate systems, exchange rate risk and hedging techniques, sources of funding, relation to international financial institutions and capital instruments; foreign direct investment; international asset and liability management.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.
Cross Listing: IBUS 446/FINC 445.

FINC 446 Technical Analysis of Financial Markets
Credits 3. 3 Lecture Hours.
Use of price, volume and other non-fundamental, market and behavioral data to analyze and predict security prices; emphasis on pattern recognition and correlation analysis over theory and casual analysis; application of technical analysis as an investment discipline for institutional portfolio management; principles, terminology, techniques and emerging theories of technical analysis.
Prerequisites: FINC 351 and FINC 361.

FINC 447/ACCT 447 Financial Statement Analysis
Credits 3. 3 Lecture Hours.
Development of an analytical approach to financial statements, integrating relevant finance and accounting concepts and principles; current topics in financial analysis.
Prerequisites: FINC 341 with a grade of C or better; ACCT 327.
Cross Listing: ACCT 447/FINC 447.
FINC 448 Advanced Investments  
Credits 3. 3 Lecture Hours.  
Application of finance theory to complex investment problems; implementation of asset pricing models, portfolio theory and arbitrage strategies; implication of principles of market efficiency and behavioral finance for selection of individual securities and portfolios.  
Prerequisites: FINC 351 and FINC 361.

FINC 449 Financial Modeling  
Credits 3. 3 Lecture Hours.  
Computer-based modeling of contemporary problems in investments and corporate finance including asset pricing, portfolio optimization, valuation, capital budgeting, cost of capital, risk assessment, and option pricing; using models to evaluate financial decision variables and alternative investment strategies.  
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 462 Commercial Bank Management  
Credits 3. 3 Lecture Hours.  
Problems confronting commercial banks such as development and application of credit standards, decisions on loan applications, liquidity management and profit sensitivity to varying levels of interest rates.  
Prerequisite: FINC 381 or concurrent enrollment.

FINC 463 Seminar in Commercial Banking  
Credits 3. 3 Lecture Hours.  
Cases and problems on contemporary management challenges and problem-solving techniques in commercial banks.  
Prerequisite: Junior or senior classification and approval of instructor.

FINC 464 Commercial Credit Analysis  
Credits 3. 3 Lecture Hours.  
Recognized techniques for assessing the ability and willingness of business firms to service debts as originally agreed; regulatory and ethical requirements for structuring and documenting commercial bank loans to protect interests of shareholders, depositors, and deposit insurers.  
Prerequisite: Admission to Mays Commercial Banking Certificate Program, or FINC 434 and approval of advisor.

FINC 465 Seminar in Investment Banking  
Credits 3. 3 Lecture Hours.  
Cases and problems on fundamentals of valuing publicly and privately held firms, underwriting public and private offerings of debt and equity securities, managing capital market risks, complying with SEC and NASD regulations and managing other financial services commonly offered by investment banks.  
Prerequisite: Junior or senior classification and approval of instructor.

FINC 466 Wall Street, Investment Banking and the Financial Markets  
Credits 3. 3 Lecture Hours.  
Experience, first-hand, the major financial markets of the United States; visits to major Wall Street firms, security and commodity exchanges, and other financial institutions.  
Prerequisites: FINC 351 and FINC 361 and approval of instructor.

FINC 472 Real Estate Finance  
Credits 3. 3 Lecture Hours.  
Real estate financing instruments, institutions and techniques; trust deed financing, mortgage underwriting and risk analysis, primary and secondary mortgage markets and institutions.  
Prerequisites: FINC 351, FINC 361 and FINC 371; ACCT 328 or concurrent enrollment.

FINC 473 Real Estate Appraisal  
Credits 3. 3 Lecture Hours.  
Impact of socio-economic forces on urban real estate values; cost, sales comparison and capitalized income approaches to market value; demonstration appraisal.  
Prerequisites: FINC 351, FINC 361 and FINC 371; ACCT 328 or concurrent enrollment.

FINC 475 Real Estate Investment Analysis  
Credits 3. 3 Lecture Hours.  
Real estate market analysis, equity investor decision criteria, institutional investment constraints and investment valuation; case analysis of specific real estate investment decisions.  
Prerequisites: FINC 351, FINC 361 and FINC 371; ACCT 328 or concurrent enrollment.

FINC 484 Professional Internship  
Credits 1 to 6. 1 to 6 Other Hours.  
Professional internship with practicing professionals under the direction of a faculty member. Available for free elective only and must be taken on a satisfactory/unsatisfactory basis.  
Prerequisites: Finance major and approval of instructor and department head.

FINC 485 Directed Studies  
Credits 0 to 6. 0 to 6 Other Hours.  
Directed study on selected problems in the area of finance not covered in other courses.  
Prerequisites: Approval of department head; FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.

FINC 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected area in finance. May include attention to aspects of real estate finance, corporate financial management, investments, or financial institutions and markets.  
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

FIVS - Forensic & Inv Science (FIVS)

FIVS 123 Forensic Investigations  
Credits 3. 3 Lecture Hours.  
Overview of forensics from incident scene to court room verdict; principles, concepts, tools and methodologies used in the science and practice of forensics; examination of various forensic fields; evidence recognition, analysis, interpretation and presentation to diverse audiences.

FIVS 205 Introduction to Forensic and Investigative Sciences  
Credits 3. 3 Lecture Hours.  
(FORS 2440) Introduction to Forensic and Investigative Sciences.  
Overview of principles, procedures, and concepts of forensic and investigative sciences; instruction in the definitions, scope, and use of tools, techniques and protocols in forensic applications used to resolve social, regulatory, and legal disputes.  
Prerequisite: Freshman or sophomore classification or approval of instructor.

FIVS 285 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Directed individual study in forensic and investigative sciences. May be repeated for credit.  
Prerequisites: Freshman or sophomore classification; approval of instructor and department head.
FIVS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of forensic and investigative sciences. May be repeated for credit.

FIVS 291 Research
Credits 0 to 4. 0 to 12 Lab Hours.
Research conducted under the direction of a faculty member in the department of entomology. May be repeated 3 times for credit.
Prerequisite: Freshman or sophomore classification.

FIVS 308 Forensic Implications of Inheritance
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Forensic genetics with an emphasis on human molecular genetics, population genetics, and genetic application in the forensic sciences.
Prerequisites: BIOL 112; upper division in forensic and investigative sciences; junior or senior classification.

FIVS 316 Biotechnology and Forensics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction of applications of biotechnology for agriculture and human health purposes; description of experimental protocols used to create genetically modified organisms (GMOs); discussion of the risks, benefits, and regulations controlling the use of biotechnology in society.
Prerequisites: GENE 301 or GENE 310 or FIVS 308 or approval of instructor.

FIVS 401/SCSC 401 Forensic Soil Science
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Examination of soils biology, chemistry and physical attributes to solve crimes; soil and geologic characteristics associated with crime scene examination; physical, biological and chemical characteristics and use of trace evidence.
Prerequisite: Junior or senior classification.
Cross Listing: SCSC 401/FIVS 401.

FIVS 415 Practice and Principles of Science and Law
Credits 3. 3 Lecture Hours.
Introduction to series of practitioners of forensic science and the justice system; receive instruction on principles, procedures, and practices used in solving legal and societal issues; examine scientific method and scientific knowledge as applied through expert testimony; enhance critical thinking and reasoning skills in studying and debating different positions of current issues of science and law.
Prerequisites: FIVS 205, FIVS 431/ENTO 431 and FIVS 432/ENTO 432; senior classification or approval of instructor; concurrent enrollment with FIVS 435.

FIVS 421 Latent Print Processing
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Information, techniques, and methodologies for processing latent fingerprints and enhancing visible fingerprints at and from crime scenes, as well as from physical evidence.
Prerequisites: FIVS 205, upper division forensic and investigative sciences academic standing, and approval of instructor.

FIVS 422 Crime Scene Investigation
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Principles, procedures, processes and hands-on experience for conducting investigations ranging from general crime scene to death investigations.
Prerequisites: FIVS 205, upper division forensic and investigative sciences academic standing, and approval of instructor.

FIVS 431/ENTO 431 The Science of Forensic Entomology
Credits 3. 3 Lecture Hours.
Explores the science, methodology and technology employed to gather, preserve, and present information about insects and other arthropods in such a manner that this information can be used in courts of law as evidence and testimony to help resolve issues of a criminal or civil nature.
Prerequisites: Junior classification or approval of instructor.
Cross Listing: ENTO 431/FIVS 431.

FIVS 432/ENTO 432 Applied Forensic Entomology
Credit 1. 3 Lab Hours.
Laboratory-based course affording practical experience using scientific information, methodology, technology, and legal procedures inherent to the field of forensic entomology; emphasis on collecting, preserving, and identifying information as evidence and expert witness testimony in courts of law.
Prerequisites: Concurrent enrollment with FIVS 431/ENTO 431; junior classification or approval of instructor.
Cross Listing: ENTO 432/FIVS 432.

FIVS 435 Case Studies in Problem Solving
Credits 3. 3 Lecture Hours.
Development of reasoning strategies by examining a variety of case studies; science and scientific method solving real-world problems as part of an investigative team.
Prerequisite: Senior classification or approval of instructor; concurrent enrollment with FIVS 415.

FIVS 481 Seminar
Credit 1. 1 Lecture Hour.
Analysis of research topics related to the fields of forensic science and law. May be taken 4 times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

FIVS 482 Occupational and Professional Development
Credits 2. 2 Lecture Hours.
Organized instruction in written and oral communication; acquaint students with private and public-sector companies and agencies as well as leading professionals from these firms to reinforce academic instruction and prepare students for the transition to employment, graduate and professional schools.
Prerequisite: Junior or senior classification or approval of instructor.

FIVS 484 Professional Internship
Credits 0 to 4. 0 to 12 Lab Hours.
Independent study and supervised field experience related to a professional area or interest in forensic science. May be taken 3 times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

FIVS 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study in forensic and investigative sciences. May be repeated for credit.
Prerequisites: Junior or senior classification; upper-division FIVS only; approval of instructor and department head.

FIVS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of forensic and investigative sciences. May be repeated for credit.
FIVS 491 Research
Credits 0 to 4. 0 to 12 Lab Hours.
Research conducted under the direction of a faculty member in the
department of entomology. May be repeated 3 times for credit.
Prerequisite: Junior or senior classification.

FREN - French (FREN)

FREN 101 Beginning French I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(FREN 1411) Beginning French I. Elementary language study with oral,
written, and reading practice. Preparation for conversation. Part of class
preparation will be done in language laboratory.

FREN 102 Beginning French II
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(FREN 1412) Beginning French II. Continuation of FREN 101. Part of class
preparation will be done in language laboratory.
Prerequisite: FREN 101.

FREN 201 Intermediate French I
Credits 3. 3 Lecture Hours.
(FREN 2311) Intermediate French I. Readings of average difficulty.
Review of grammar; practice in conversation and composition.
Prerequisite: FREN 102.

FREN 202 Intermediate French II
Credits 3. 3 Lecture Hours.
(FREN 2312) Intermediate French II. Continuation of FREN 201 with more
advanced material.
Prerequisite: FREN 201.

FREN 221 Field Studies I
Credits 3. 3 Other Hours.
French language and culture taught in France; supervised travel of
cultural interest; living with local families; participation in the activities
and courses of a French university or institute; written and oral reports,
exams; to be taken concurrently with FREN 222.
Prerequisite: FREN 202 with a grade of B or higher or approval of
instructor.

FREN 222 Field Studies II
Credits 3. 3 Other Hours.
French language and literature taught in France in cooperation with
a French university or institute; exams, written reports; to be taken
concurrently with FREN 222
Prerequisite: FREN 202 with a grade of B or higher or approval of
instructor.

FREN 223/EURO 223 French Culture and Society in French Literary
Masterpieces in Translation
Credits 3. 3 Lecture Hours.
Analysis and understanding of French culture and contemporary society
through the study of masterpieces of French literature including novels,
plays, short stories and films.
Cross Listing: EURO 223/FREN 223.

FREN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects in French,
selected for each student individually.
Prerequisite: Approval of instructor and department head.

FREN 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of French. May be repeated for
credit.
Prerequisite: Approval of instructor.

FREN 300 Written Communication in the French-Speaking World
Credits 3. 3 Lecture Hours.
Strategies for effective communication in the written language; active
production of a variety of narrative, expository, analytical, persuasive
and epistolary texts with special attention to language appropriate to
various social, professional and cultural contexts both in French and in
the Francophone world; conducted in French.
Prerequisite: FREN 202 or FREN 222.

FREN 301 French Society and Culture in Evolution
Credits 3. 3 Lecture Hours.
Events, figures, monuments, laws and cultural productions, texts and
events participating in the evolution of French institutions, religion, socio-
economic structures, marriage, sexuality and identities from the Gallo-
Roman period through May 1968; conducted in French.
Prerequisite: FREN 202 or FREN 222.

FREN 306 Technical and Business French
Credits 3. 3 Lecture Hours.
Advanced-intermediate course to provide cross-cultural communication
skills crucial to succeeding in a francophone business or technical
environment, including topics on business and technical jargon,
coresspondence, résumés, interviewing, the European Union,
telecommunications, technology and the French-speaking community.
Prerequisite: FREN 202 or FREN 222 or approval of instructor.

FREN 311 Oral Communication in the French-Speaking World
Credits 3. 3 Lecture Hours.
Strategies for effective communication in the spoken language; case
studies in economic, political, cultural, social and environmental issues
as presented through the press and audio-visual media of France and the
Francophone world; conducted in French.
Prerequisite: FREN 202 or FREN 222.

FREN 321 French Literature I
Credits 3. 3 Lecture Hours.
Representative works of French poetry, theater, essays and novels in the
historical, cultural and political context of French society from the Middle
Ages through the 18th century; conducted in French.
Prerequisite: FREN 202 or FREN 222.

FREN 322 French Literature II
Credits 3. 3 Lecture Hours.
Representative works of French and Francophone novels, plays, poetry
and essays reflecting the societies and cultural experience of French-
speaking people in the 19th, 20th and 21st centuries; conducted in French.
Prerequisite: FREN 202 or FREN 222.

FREN 336 Politics, Culture and Society in Contemporary France
Credits 3. 3 Lecture Hours.
Contemporary France. Salient aspects of present-day French society and
culture, including government, demographics, immigration, education,
families, gender roles, entertainment and leisure, social classes and
cross-cultural tensions; conducted in French.
Prerequisite: FREN 202 or FREN 222.
FREN 375 The Francophone World
Credits 3. 3 Lecture Hours.
The peoples, cultures and societies of French-speaking communities outside of France, with special attention to their colonial origins and current issues of politics, identities and migrations as represented in the press and media as well as in works of film and literature; conducted in French.
Prerequisite: FREN 202 or equivalent; junior or senior classification.

FREN 410 Seminar in French Literature
Credits 3. 3 Lecture Hours.
Exploration of a significant topic or period in French literature; conducted in French. May be repeated for credit.
Prerequisites: FREN 300 and an additional 3 hours at 300-level.

FREN 418 Seminar in French Civilization
Credits 3. 3 Lecture Hours.
Discussions and observation of particular events and institutions crucial to the development of French society and culture; analysis of literary, artistic and cinematic representations of events and phenomena such as the French revolution, May 1968, and church and state relations; conducted in French. May be repeated for credit.
Prerequisites: FREN 300 and an additional 3 hours at 300-level.

FREN 422/WGST 422 Studies in Gender and French Literature
Credits 3. 3 Lecture Hours.
The role of gender in the production, dissemination, reception and interpretation of literary texts in the French tradition, including continental France as well as the Francophone literatures of West Africa, Canada, and elsewhere; taught in English.
Prerequisite: FREN 202 or approval of instructor.
Cross Listing: WGST 422/FREN 422.

FREN 425/FILM 425 French Film
Credits 3. 3 Lecture Hours.
Overview of French cinema from its origins to the present; interpretation of French cultural history and politics through film; taught in English.
Prerequisites: Junior or senior classification, or approval of instructor.
Cross Listing: FILM 425/FREN 425.

FREN 481 Seminar in French and Francophone Studies
Credits 3. 3 Lecture Hours.
In-depth exploration of topics in French and Francophone literature, culture, and/or film, involving individual student research projects. May be taken two times for credit as topics change.
Prerequisite: Junior or senior classification or approval of instructor.

FREN 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports.
Prerequisite: Approval of instructor and department head.

FREN 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of French. May be repeated for credit.
Prerequisite: Approval of instructor.

FREN 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in French. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of department head.

FRSC - Forest Science (FRSC)

FRSC 420 Arboriculture
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Tree selection and planting to fit climatic, space and edaphic conditions; diagnosing tree abnormalities and practicing intensive tree care. Frequent field work and demonstrations.
Prerequisite: Senior classification or approval of instructor.

FRSC 421 Urban Forestry
Credits 3. 3 Lecture Hours.
Conceptual role of trees in improving the urban environment; optimum use of existing forested areas and the establishment of trees in appropriate open spaces; tree ordinances, species evaluation, street tree planning and tree inventory systems.
Prerequisite: Approval of instructor.

FSTC - Food Science & Tech (FSTC)

FSTC 201 Food Science
Credits 3. 3 Lecture Hours.
(AGRI 1329) Food Science. The fundamental biological, chemical and physical scientific principles associated with the study of foods; topics include food composition and nutrition, food additives and regulations, food safety and toxicology, food processing, food engineering, food biotechnology, product development and sensory evaluation.

FSTC 210/NUTR 210 Horizons in Nutrition and Food Science
Credits 2. 2 Lecture Hours.
Introduction to nutrition and food science career opportunities through presentations by nutrition and food science researchers and industry professionals; addresses issues of professionalism including portfolio development, teamwork, and critical thinking skills.

FSTC 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study of selected problems in the area of food science.
Prerequisites: Approval of instructor; 2.0 GPR in major and overall.

FSTC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of food science and technology. May be repeated for credit.
Prerequisite: Approval of instructor.

FSTC 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in food science and technology. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

FSTC 300/NUTR 300 Religious and Ethnic Foods
Credits 3. 3 Lecture Hours.
Understanding religious and ethnic foods with application to product development, production, and nutritional practices; emphasis on different food rules and priorities with attention given to different religious and ethnic groups within the US and around the world.
Prerequisites: Junior or senior classification or approval of instructor; basic knowledge of food science and nutrition helpful.
Cross Listing: NUTR 300/FSTC 300.
FSTC 305 Fundamental Baking
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Fundamentals of baking; chemical and physical properties of ingredients, methods of baking all products, fundamental reactions of dough, fermentation and oven baking.
Prerequisite: CHEM 222 or 227 or approval of department head.

FSTC 307/ANSC 307 Meats
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Integrated studies of the meat animal processing sequence regarding the production of meat-type animals and the science and technology of their conversion to human food.
Prerequisites: ANSC 107 and 108 or approval of department head.

FSTC 311/HORT 311 Principles of Food Processing
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited.
Prerequisite: FSTC 201; junior or senior classification or approval of department head or instructor.

FSTC 312/DASC 312 Food Chemistry
Credits 3. 3 Lecture Hours.
The fundamental and relevant chemistry and functionality of the major food constituents (water, carbohydrates, lipids, proteins, phytochemical nutraceuticals) and study of food emulsion systems, acids, enzymes, gels, colors, flavors and toxins.
Prerequisite: FSTC 201; CHEM 227; CHEM 237 or approval of department head or instructor.

FSTC 313/DASC 313 Food Chemistry Laboratory
Credit 1. 3 Lab Hours.
Laboratory exercises investigating specific molecules, such as food acids, enzymes, pigments and flavors, and chemical interactions in foods, such as oxidation reactions, emulsion systems, and functional properties from a fundamental chemistry rather than an analytical perspective.
Prerequisite: FSTC 201; CHEM 227; CHEM 237 or approval of department head or instructor.

FSTC 314/DASC 314 Food Analysis
Credits 3. 1 Lecture Hour. 4 Lab Hours.
Selected standard methods for assay of food components; principles and methodology of both classical and instrumental techniques in food analysis.
Prerequisite: FSTC 201; FSTC 311/HORT 311; CHEM 227; CHEM 237 or approval of department head or instructor.

FSTC 315/AGSM 315 Food Process Engineering Technology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Elementary mechanics, physical and thermal properties of food and processing materials, heat transfer, mass and energy balances, psychrometrics (properties of air), insulation.
Prerequisites: PHYS 201 or PHYS 218, or approval of instructor.

FSTC 326/DASC 326 Food Bacteriology
Credits 3. 3 Lecture Hours.
Microbiology of human foods and accessory substances. Raw and processed foods; physical, chemical and biological phases of spoilage. Standard industry techniques of inspection and control.
Prerequisite: BIOL 206 or approval of instructor; junior or senior classification.

FSTC 327/DASC 327 Food Bacteriology Lab
Credit 1. 3 Lab Hours.
Laboratory to accompany FSTC 326/DASC 326.

FSTC 330 Dairy and Food Technology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Principles and practices involved in processing of milk into market milk, butter, cheese and cheese foods; fundamental principles of these processes as related to their design and control.

FSTC 331 Dairy and Food Technology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Manufacture of frozen, freeze-dehydrated, concentrated and dehydrated dairy foods; fundamental aspects of freezing, concentration and dehydration of foods.
Prerequisite: FSTC 330 or approval of department head.

FSTC 401 Food Product Development
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Design and develop food products using principles of food chemistry, food processing, nutrition, sensory analysis and statistics; team collaborate to improve food product characteristics to meet the needs of a changing society.

FSTC 405/POSC 405 Egg and Poultry Meat Processing
Credits 3. 3 Lecture Hours.
Principles of egg and poultry meat processing, understanding egg and poultry meat markets, egg and meat grading, product safety, packaging and consumer acceptance of shell eggs and poultry meat, specifically turkey and broilers.
Prerequisites: Junior or senior classification or approval of instructor.

FSTC 406/POSC 406 Poultry Further Processing
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Science and practice of value-added products; physical, chemical, microbiological and functional characteristics of value-added poultry products as they affect consumer acceptance, efficiency of production and regulatory approval.

FSTC 410/NUTR 410 Nutritional Pharmacometrics of Food Compounds
Credits 3. 3 Lecture Hours.
Nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
Prerequisites: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 222 or CHEM 227 or approval of instructor; junior or senior classification.

Cross Listing: AGSM 315/FSTC 315.
FSTC 417/AGSM 417 Food Process Engineering Technology II
Credits 3. 3 Lecture Hours.
Applications of basic engineering concepts to understand common unit operations in the food (and related) industry.
Prerequisites: AGSM 315/FSTC 315 or FSTC 315/AGSM 315.
Cross Listing: AGSM 417/FSTC 417.

FSTC 420 Supervised Research in Mediterranean Nutrition and Food Processing in Italy
Credits 3. 3 Other Hours.
Exploration of principles of Mediterranean diet, European nutrition regulatory aspects, wine-making and food processing in Italy.
Prerequisite: FSTC 201, NUTR 202 or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.
Cross Listing: NUTR 420.

FSTC 422 Food Processing for Sustainable Nutrition in Brazil
Credits 3. 3 Other Hours.
Sustainable nutrition and food processing in Brazil; hands-on learning at the Federal University of Vicosa, the Amazon Biotechnology Center, food processing plants and other research centers in the Amazon, central Brazil and Rio De Janeiro.
Prerequisites: FSTC 201, NUTR 202, or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.
Cross Listing: NUTR 422.

FSTC 440/NUTR 440 Therapeutic Microbiology: Probiotics and Related Strategies
Credits 3. 3 Lecture Hours.
Topics relevant to alimentary (gastrointestinal) microbiology including (i) the "normal" intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant pharma biotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne gastrointestinal pathogens; and (vi) fermented products as functional foods.
Prerequisites: Undergraduate survey course in microbiology or approval of instructor; junior or senior classification.
Cross Listing: NUTR 440/FSTC 440.

FSTC 444 Fundamentals of Food Law
Credits 3. 3 Lecture Hours.
History, development of, and fundamental principles behind current food regulations, including food labeling, adulteration, food safety, food additives, dietary supplements, and import and export laws; overview of government agency jurisdiction, international law and ethics.
Prerequisite: FSTC 201; junior or senior classification.

FSTC 446/HORT 446 Commercial Fruit and Vegetable Processing
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages; new product development emphasized via individual laboratory projects.
Prerequisite: FSTC 311/HORT 311.
Cross Listing: HORT 446/FSTC 446. (Offered in even numbered years.)

FSTC 457/ANSC 457 Hazard Analysis and Critical Control Point System
Credits 3. 3 Lecture Hours.
Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices and standard operating procedures development.
Prerequisite: FSTC 326/DASC 326 or approval of instructor.
Cross Listing: ANSC 457/FSTC 457.

FSTC 469/NUTR 469 Experimental Nutrition and Food Science Laboratory
Credits 4. 1 Lecture Hour. 6 Lab Hours.
Investigation of nutritional intervention in animal models of metabolic and psychological disorders (e.g. obesity and depression); investigational approaches such as behavioral analyses; RNA and protein analyses; reverse transcription PCR.
Prerequisites: CHEM 227; CHEM 237; junior or senior classification or approval of instructor.
Cross Listing: NUTR 469/FSTC 469.

FSTC 470/ANSC 470 Quality Assurance for the Food Industry
Credits 3. 3 Lecture Hours.
Principles of food system process control including statistical process control (SPC) and the tools required to assure uniform communication and understanding of quality assurance systems.
Prerequisite: Junior or senior classification.
Cross Listing: ANSC 470/FSTC 470.

FSTC 471/NUTR 471 Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews
Credits 3. 3 Lecture Hours.
Evaluation of scientific literature, research methods within the literature, and the quality of scientific studies to produce an evidence-based review in areas specific to nutrition and food science.
Prerequisites: NUTR 202 or NUTR 203 and STAT 302; junior or senior classification; knowledge of technical writing helpful.
Cross Listing: NUTR 471/FSTC 471.

FSTC 481 Seminar
Credit 1. 1 Lecture Hour.
Guidelines and practice in journal article review and making effective technical presentations; strategies for conducting a job search; development of résumés and letters and interviewing targeted for careers in the food industry or graduate school.
Prerequisite: Senior classification in food science and technology.

FSTC 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study on selected problems in the area of food technology not covered in other courses.
Prerequisites: Junior or senior classification; approval of department head; 2.0 GPR in major and overall.

FSTC 487/NUTR 487 Sensory Evaluation of Foods
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of sensory science principles and practices to food systems including an understanding of discriminative, descriptive and consumer sensory techniques;
Prerequisites: CHEM 222 or CHEM 228; junior or senior classification.
Cross Listing: ANSC 487/FSTC 487.

FSTC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of food science and technology. May be repeated for credit.

FSTC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in food science and technology. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
**GALV - TAMUG Study Abroad (GALV)**

GALV 300 TAMUG Study Abroad  
Credits 1 to 18. 1 to 18 Lecture Hours.  
For students in approved study abroad programs; may be repeated for credit.

GALV 301 TAMUG Study Abroad  
Credits 1 to 18. 1 to 18 Lecture Hours.  
For students in approved study abroad programs; may be repeated for credit.

**GENE - Genetics (GENE)**

GENE 101/BICH 101 Perspectives in Biochemistry and Genetics  
Credit 1. 1 Lecture Hour.  
Introduction to biochemistry and genetics and their relationship to the biological, biophysical and chemical sciences.  
Prerequisite: Biochemistry and genetics major or approval of instructor.  
Cross Listing: BICH 101/GENE 101.

GENE 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Introduction to laboratory research.  
Prerequisite: Freshman or sophomore classification in genetics or approval of instructor.

GENE 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Other Hours.  
Selected topics in an identified area of genetics. May be repeated for credit.  
Prerequisites: Freshman or sophomore classification in genetics; approval of instructor.

GENE 291 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in genetics. May be repeated 2 times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

GENE 301 Comprehensive Genetics  
Credits 3. 3 Lecture Hours.  
Survey of the fundamental principles of genetics: Physical basis of Mendelian inheritance, expression and interaction of genes, linkage, sex linkage, biochemical nature of genetic material and mutation. No credit will be given for more than one of GENE 301, GENE 302, GENE 315 or GENE 320/BIMS 320. Not open to biochemistry or genetics majors.  
Prerequisite: BIOL 112; concurrent enrollment in GENE 312.

GENE 302 Principles of Genetics  
Credits 3. 3 Lecture Hours.  
Mechanisms of inheritance, stressing the conservation of fundamental genetic processes throughout evolution, from bacteria to humans; mutations and phenotypes, Mendelian genetics, population genetics and evolution, and complex inheritance. Course designed for biochemistry, genetics and all majors in biology. No credit will be given for more than one of GENE 301, GENE 302, GENE 315 and GENE 320/BIMS 320.  
Prerequisite: BIOL 112; concurrent enrollment in GENE 312.

GENE 310 Principles of Heredity  
Credits 3. 3 Lecture Hours.  
Basic principles of classical genetics, molecular genetics, mutation theory and genetic engineering; emphasis on humans and society. Not open to biochemistry and genetics majors.  
Prerequisite: Junior classification.

GENE 312 Comprehensive Genetics Laboratory  
Credit 1. 0 Lecture Hours. 3 Lab Hours.  
Exercises in Mendelian genetics, meiosis, probability theory in pedigrees, population and quantitative genetics, as well as other genetics theory; molecular techniques to examine DNA and analyze outcomes.  
Prerequisite: GENE 301 or GENE 302 or registration therein.

GENE 315 Genetics of Plants  
Credits 3. 3 Lecture Hours.  
Fundamental genetic principles as applied to plants: transmission, replication, expression and interaction of genes; linkage, recombination and mapping; chromosomal and gene mutation; behavior of genes in populations; selection, mating systems, cytoplasmic inheritance; molecular analysis and manipulation of genes and gene products; genetically modified plants. Not open to biochemistry or genetics majors. No credit will be given for more than one of GENE 301, GENE 302, GENE 315 or GENE 320/BIMS 320.  
Prerequisite: BIOL 101 or BIOL 111.

GENE 320/BIMS 320 Biomedical Genetics  
Credits 3. 3 Lecture Hours.  
Fundamental genetic principles as applied to biomedical science; Mendelian inheritance, linkage and genetic mapping, mutagenesis and pedigree analysis; molecular basis of gene function and inherited disease; gene therapy and genetic counseling. No credit will be given for more than one of GENE 301, GENE 302, GENE 315 or GENE 320/BIMS 320.  
Prerequisite: BIMS major with a minimum overall 2.5 Texas A&M GPA.  
Cross Listing: BIMS 320/GENE 320.

GENE 404 Plant Breeding  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Application of genetics and other sciences to the breeding and improvement of horticultural crops; methods and special techniques employed.  
Prerequisite: GENE 301.  
Cross Listing: HORT 404/GENE 404. Credit cannot be given for HORT 404/GENE 404 and SCSC 304.

GENE 405/BIMS 405 Mammalian Genetics  
Credits 3. 3 Lecture Hours.  
Comparative mammalian genetic systems with emphasis on laboratory animals; organization and expression of mammalian genes; development and use of genetically defined animals in biomedical and genetic research.  
Prerequisite: GENE 302.  
Cross Listing: BIMS 405/GENE 405.

GENE 406/BIOL 406 Bacterial Genetics  
Credits 3. 3 Lecture Hours.  
A problem oriented course surveying the manipulation and mechanisms of genetic systems in bacteria; recombination, gene structure and regulation of bacterial genes, plasmids and phages.  
Prerequisites: GENE 302; BIOL 351.  

GENE 411/MEPS 411 Biotechnology for Crop Improvement  
Credits 3. 3 Lecture Hours.  
Use of biotechnology to improve agricultural, horticultural and forest crops; techniques and methods used and case studies where biotechnology has been used to alter traits such as pathogen resistance, protein or oil consumption, ripening, fertility and wood properties.  
Prerequisite: BIOL 111 or equivalent.  
Cross Listing: MEPS 411/GENE 411.
GENE 412 Population and Ecological Genetics
Credits 3. 3 Lecture Hours.
Concepts of population genetics including dynamics of natural populations with emphasis on ecological interactions.
Prerequisite: GENE 302.

GENE 419/BICH 419 Computational Techniques for Evolutionary Analysis
Credits 3. 3 Lecture Hours.
Computational techniques for studying evolution; algorithms for construction and analysis of evolutionary relationships.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: BICH 419/GENE 419.

GENE 420 Bioethics
Credits 3. 3 Lecture Hours.
The application of ethical theory to the use of modern genetics and biochemistry stressing the social implications of genetic engineering, agricultural manipulation and biotechnology.
Prerequisites: GENE 302; BICH 410 or BICH 440.

GENE 421/BIMS 421 Advanced Human Genetics
Credits 3. 3 Lecture Hours.
A rigorous, analytical approach to genetic analysis of humans including diagnosis and management of genetic disease in humans; transmission of genes in human populations; human cytogenetics; the structure of human genes; human gene mapping; molecular analysis of genetic disease; genetics screening and counseling.
Prerequisites: GENE 302; BICH 410 or BICH 440.
Cross Listing: BIMS 421/GENE 421.

GENE 431/BICH 431 Molecular Genetics
Credits 3. 3 Lecture Hours.
Molecular basis for inheritance including gene structure and function, chromosomal organization, replication and repair of DNA, transcription and translation, the genetic code, regulation of gene expression, genetic differentiation and genetic manipulations.
Prerequisites: BICH 410 or BICH 440; GENE 301 or GENE 302 or GENE 320/BIMS 320.
Cross Listing: BICH 431/GENE 431.

GENE 432/BICH 432 Laboratory in Molecular Genetics
Credits 2. 6 Lab Hours.
Laboratory for molecular genetics providing technical experience with tools of molecular biology.
Prerequisite: GENE 301, GENE 302 or GENE 320/BIMS 320; BICH 410 or BICH 440.
Cross Listing: BICH 432/GENE 432.

GENE 450 Recombinant DNA and Biotechnology
Credits 3. 3 Lecture Hours.
Basic genetic engineering techniques; cloning with plasmid, lambda, cosmid and M13 vectors; gene libraries; DNA sequencing and mutagenesis; PCR; eucaryotic expression with yeast, baculovirus and mammalian vectors; transgenic animals and plants; gene therapy; monoclonal antibodies; bioremediation.
Prerequisites: BICH 431/GENE 431 or GENE 431/BICH 431 or concurrent registration; BICH 411 or 441 or concurrent registration.

GENE 452/BIMS 452 Modifying Mammalian Genomes for Biomedical Research
Credits 3. 3 Lecture Hours.
Review advances in the production of transgenic animals, the manipulation of embryonic stem cells for transgenics and therapeutics, the modification of specific genes in mammalian species by homologous recombination and RNA interference; special emphasis on genetic manipulation of cells and animals for biomedical research, stem-cell and gene therapy.
Prerequisite: GENE 302.
Cross Listing: BIMS 452/GENE 452.

GENE 481 Genetics I Seminar
Credit 1. 1 Lecture Hour.
Seminar topics on recent developments in genetics.
Prerequisites: GENE 302; GENE 431/BICH 431 or concurrent registration; senior classification or approval of instructor.

GENE 482 Genetics II Seminar
Credit 1. 1 Lecture Hour.
Student preparation and presentation of pertinent genetics topics.
Prerequisites: GENE 481; senior classification or approval of instructor.

GENE 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study in genetics not included in established courses.
Prerequisites: Junior or senior classification; approval of instructor and department head.

GENE 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of genetics. May be repeated for credit.
Prerequisite: Approval of instructor.

GENE 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Laboratory research supervised by a faculty member.
Prerequisites: Major in genetics; junior or senior classification in genetics or approval of instructor.

GEOG - Geography (GEOG)

GEOG 201 Introduction to Human Geography
Credits 3. 3 Lecture Hours. 1 Lab Hour.
(GEOG 1302) Introduction to Human Geography. A survey of the major systems of man-land relations of the world and their dissimilar developments; the processes of innovation, diffusion, and adaptation stressed with regard to changing relationships between people and their environment.

GEOG 202 Geography of the Global Village
Credits 3. 3 Lecture Hours.
(GEOG 1303) Geography of the Global Village. Survey of world regions; globalization; environmental problems at multiple scales; human-environment interactions; cultural coherence and diversity; population and settlement; geopolitics; social and economic development; place identification.

GEOG 203 Planet Earth
Credits 3. 3 Lecture Hours. 1 Lab Hour.
(GEOG 1301) Planet Earth. Earth's physical environment including climate, water, landforms, and ecosystems; processes that control these systems and their global distributions; human effects on these processes.
GEOG 205 Environmental Change  
Credits 3. 3 Lecture Hours.  
Systems perspective on important attributes, elements, and connections within earth’s physical environment; dynamic nature of environment at multiple spatial and temporal scales.  

GEOG 213 Planet Earth Lab  
Credit 1. 3 Lab Hours.  
Exercises and maps to illustrate principles of physical geography.  

GEOG 232 Cartography and Visualization  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Introduction to science and art of map production; principles of thematic map compilation and design; history of thematic mapping; map projections; data management and symbolization; common types and styles of thematic maps.  

GEOG 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Individually-supervised research or intensive study on topics not covered in regular courses.  
Prerequisite: Approval of department head.  

GEOG 291 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in geography. May be taken 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Freshman or sophomore classification and approval of instructor.  

GEOG 301 Geography of the United States  
Credits 3. 3 Lecture Hours.  
Geographic personality (physical and cultural) of the United States.  

GEOG 304 Economic Geography  
Credits 3. 3 Lecture Hours.  
Location of economic activities over the earth; distribution of agriculture, manufacturing, tertiary activities and transportation; economic growth of areas.  

GEOG 305 Geography of Texas  
Credits 3. 3 Lecture Hours.  
Exploration into the geographic personality of Texas: past and current physical and biotic environments; cultural pluralism, including ethnic origins and distinctive human ecologies; and the social, economic and political sources of environmental problems.  

GEOG 306 Introduction to Urban Geography  
Credits 3. 3 Lecture Hours.  
Reasons humankind tends to congregate in cities. Overview of patterns in the geographic distribution of cities, and in the geographic distribution of peoples and activities within cities, and the dynamics of these distributions.  

GEOG 309 Geography of Energy  
Credits 3. 3 Lecture Hours.  
Development of high-energy society; renewable and nonrenewable energy resources; physical and social economies of energy use; geography of energy; energy problems and decisions; dependence of other resources on energy; alternative energy futures.  
Prerequisite: Junior classification or approval of instructor.  

GEOG 311 Cultural Geography  
Credits 3. 3 Lecture Hours.  
Human factors which affect man-land relationship; concept of culture, culture areas; population growth and migrations, types of economic activity, urban and transportation geography.  

GEOG 312 Data Analysis in Geography  
Credits 3. 3 Lecture Hours.  
Foundation for collection and analysis of quantitative and qualitative geographic data; emphasis on hands-on, practical experience with commonly used analysis software and qualitative methods including interviewing and archival research; problems commonly encountered in dealing with data.  
Prerequisite: STAT 303.  

GEOG 320 The Middle East  
Credits 3. 3 Lecture Hours.  
Regional geography of the Middle East; physical setting and the historical evolution of Middle Eastern landscapes; current issues.  
Prerequisites: Junior or senior classification.  

GEOG 323 Geography of Latin America  
Credits 3. 3 Lecture Hours.  
Physical and cultural characteristics of Latin America; physical landscape, cultural succession and the present cultural landscape; details on sub-regions.  

GEOG 324 Global Climatic Regions  
Credits 3. 3 Lecture Hours.  
Climatological processes and their consequences for spatial distributions of climates; survey of earth’s climates; relationships among climate, landforms, vegetation, soils and humans.  
Prerequisite: GEOG 203 or ATMO 201 or approval of instructor.  

GEOG 325 Geography of Europe  
Credits 3. 3 Lecture Hours.  
Regional geography of European landmass; global, political and cultural characteristics of European geography in historical and ecological contexts.  
Prerequisite: Junior or senior classification.  

GEOG 327 Geography of South Asia  
Credits 3. 3 Lecture Hours.  
South Asian geography; political and physical geographic divisions of South Asia; diversity of region; people, history, religion, cultures, political systems, rural and urban settings, climate, and environment; current problems and solutions.  
Prerequisite: Junior or senior classification or approval of instructor.  

GEOG 330 Resources and the Environment  
Credits 3. 3 Lecture Hours.  
Changing demand for land and sea resources; international conditions of population growth, resource depletion and geopolitical control; resource perceptions and decision-making.  

GEOG 331 Geomorphology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Principles and fundamentals of landform analysis. Laboratory work in advanced map interpretation.  
Prerequisite: GEOL 101 or GEOG 203.
GEOG 335 Pattern and Process in Biogeography
Credits 3. 3 Lecture Hours.
Distribution of organisms across the earth and on environmental and cultural processes that have contributed to these patterns of distribution; dynamic nature of biogeographic patterns; impacts of contemporary and prehistoric humans on plant and animal distributions; methods for exploring biogeographic patterns and detecting change.
Prerequisite: Junior or senior classification.

GEOG 352/GEOL 352 GNSS in the Geosciences
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Fundamentals of Global Navigation Satellite Systems (GNSS); basic geodesy, figure of the earth; frames of reference, map projection, datums, ellipsoids; GPS accuracy and precision; applications in earth resource mapping and database creation; elementary GPS phase data processing.
Prerequisite: Junior or senior classification or approval of instructor.

GEOG 355 Concepts in Geographic Education
Credits 3. 3 Lecture Hours.
Key concepts and generalizations of geography; learning theory applied to geography and environmental education; development of field and computerbased technical/intellectual skills required to teach geography; curriculum and instructional issues related to geography.
Prerequisites: GEOG 201 or GEOG 202; GEOG 203 or equivalent.

GEOG 360 Natural Hazards
Credits 3. 3 Lecture Hours.
Introduction to the types and causes of natural events that pose risk to society; an examination of prevailing concepts and theories of human response and vulnerability; characteristics of natural events; natural hazard paradigms; case studies.
Prerequisites: GEOG 203 or GEOL 101; junior or senior classification.

GEOG 361 Remote Sensing in Geosciences
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Introduction to the principles, techniques and applications of remote sensing technology in geosciences including the analysis and interpretation of airborne and spaceborne remote sensing data for studying key earth system processes.
Prerequisite: Junior or senior classification.

GEOG 370/MARS 370 Coastal Processes
Credits 3. 3 Lecture Hours.
Introduction to the coastal system, waves and wave dominated coasts, shoreline morphodynamics, tidal and lake coasts, long term coastal development, sea level changes, subtidal and beach ecosystems, coastal dunes and wetlands, structures and organizations, coastal management and coastal hazards.
Cross Listing: MARS 370/GEOG 370.

GEOG 380 Workshop in Environmental Studies
Credits 2 to 6. 2 to 6 Lab Hours.
The study, understanding and solution of human environment problems based on principles learned in the classroom; library, laboratory and field work carried out by individuals and in groups; reports on work accomplished. May be repeated for credit as many as three times.
Prerequisite: GEOG 330.

GEOG 390 Principles of Geographic Information Systems
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Basic concepts of design, planning and implementation of geographic information systems.
Prerequisite: Junior or senior classification.

GEOG 391 Geodatabases
Credits 3. 3 Lecture Hours. 1 Lab Hour.
GIS data modeling; introductory and advanced spatial SQL (structured query language); spatial database management system (DBMS) server setup, management and maintenance; spatial DBMS design, implementation, tuning, performance analysis and indexing; connecting spatial data services and warehouses to GIS software.
Prerequisite: Junior or senior classification.

GEOG 392 GIS Programming
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Programming for geographic information science applications; principles of programming syntax and data structures; development of custom GIS programs; integration of programs into commercial GIS platforms.
Prerequisites: GEOG 390 and ESSM 465 or equivalents, or approval of instructor; junior or senior classification.

GEOG 398 Interpretation of Aerial Photographs
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Identification and evaluation of natural and cultural features on aerial photographs; methods for extracting information concerning land use, vegetative cover, surface and structural features, urban/industrial patterns and archaeological sites.
Prerequisites: Junior or senior classification or approval of instructor.

GEOG 400 Arid Lands Geomorphology
Credits 3. 3 Lecture Hours.
Introduction to the geomorphology of deserts; processes, origin and evolution of arid lands; urban geomorphology in drylands; desertification.

GEOG 401 Political Geography
Credits 3. 3 Lecture Hours.
The political process at a variety of geographic scales: international, intranational and urban; origins of territorial organization and conflicts over access to and use of space and its resources.

GEOG 404 Spatial Thinking, Perception and Behavior
Credits 3. 3 Lecture Hours.
Spatial thinking, spatial perception of the environment and the ways thinking and perception influence spatial behavior; role of geospatial technologies in supporting spatial thinking; models of spatial thinking acquisition; cognitive maps and spatial decision making; developing spatial thinking and individual differences.
Prerequisite: Junior or senior classification.

GEOG 405 Field Trips
Credits 1 to 4. 1 to 4 Other Hours.
Supervised field trip to investigate the physical, economic and cultural processes that influence the spatial development and distribution on the landscape. May be repeated for credit.
Prerequisites: Geography course at the 200-level or registration therein; approval of instructor.

GEOG 406 Geographic Perspectives on Contemporary Urban Issues
Credits 3. 3 Lecture Hours.
Contemporary readings on spatial patterns and processes in urban environments; sprawl; human-environment interaction; housing; development and growth; concept of place; scale; power and policy.
Prerequisite: GEOG 304 or GEOG 306 or equivalent.

GEOG 420 Geography of Terrorism
Credits 3. 3 Lecture Hours.
Exploration of global terrorism and counter terrorism; regional conflicts and mass violence; construction of places and regions associated with terror; American reactions to global terrorism.
Prerequisite: Junior or senior classification.
GEOG 430 Environmental Justice
Credits 3. 3 Lecture Hours.
Exploration into the spatial variability and human geography of exposure to environmental hazards in U.S. and international contexts; emphasizes environmental equity and environmental racism as it relates to occupational, leisure, and residential geography.
Prerequisites: GEOG 201 or GEOG 202; junior or senior classification.

GEOG 434 Hydrology and Environment
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Examination of hydrologic processes in relation to climate, soils, vegetation, land use practices, and human impacts; natural scientific perspectives emphasized; field and laboratory included.
Prerequisite: GEOG 203 or equivalent.

GEOG 435 Principles of Plant Geography
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Plant distributions, their associations and environmental relationships; survey of the principal explanatory systems; field and laboratory study of area patterns at various geographic scales. A weekend field trip is required.
Prerequisite: BIOL 101 or BIOL 107 or BIOL 301 or approval of instructor.

GEOG 440 History and Nature of Geography
Credits 3. 3 Lecture Hours.
Summary of classical knowledge of world; development of thought on nature of geography from 1800 to present.
Prerequisite: Junior or senior classification.

GEOG 442/GEOS 442 Past Climates
Credits 3. 3 Lecture Hours.
Terrestrial and marine proxy records of past climate variability, including tree rings, coral, and sediments; past climate change events such as the Little Ice Age and Medieval Warm Period; greenhouse gases and global temperature; insight into the nature of climate change and challenges humankind faces in the next few centuries.
Prerequisites: ATMO 201, or GEOG 203, or GEOL 101, or GEOL 104, or OCN 251; junior or senior classification.
Cross Listing: GEES 442/GEOG 442.

GEOG 450 Field Geography
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Introduction to field methods; documenting materials, reconnaissance, the field plan; mapping traverse, base maps and aerial photographs; recording techniques; interview procedures. Fields trips required, some on weekends and/or semester breaks, for which departmental fees may be assessed to cover costs.
Prerequisite: 15 hours of geography or equivalent.

GEOG 461 Digital Image Processing in the Geosciences
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Key remote-sensing digital image processing methods; advanced topics in feature extraction, radiometric calibration, image enhancement, pattern recognition and geoscience applications.
Prerequisite: GEOG 361 or equivalent and junior or senior classification.

GEOG 462/ESSM 462 Advanced GIS Analysis for Natural Resources Management
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Advanced topics in geographic information systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects particularly with habitat suitability models; field and lab use of global positioning systems (GPS); internet-based GIS modeling.
Prerequisites: ESSM 351/RENR 405 or AGSM 461/SPSC 461 or equivalent or approval of instructor; junior or senior classification.
Cross Listing: ESSM 462/GEOG 462.

GEOG 467 Dynamic Modeling of Earth and Environmental Systems
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Dynamical systems modeling; key concepts and processes in earth and environmental systems; human impact on these systems; model building and testing; system behavior over time; model validation and sensitivity; examples from the applications in earth and environmental sciences.
Prerequisite: GEOG 203 or approval of instructor.

GEOG 475 Advanced Topics in GIS (Geographic Information Systems)
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Advanced Topics in Geographic Information Systems. Topics related to GIS implementation, spatial database design, spatial data analysis, and various advanced GIS applications.
Prerequisite: GEOG 390 or equivalent.

GEOG 476 GIS Practicum
Credits 3. 3 Other Hours.
Introduction to current topics in Geographic Information Science including ethical and legal issues surrounding spatial technologies, proper GIS management practices and professional certification; development of professional research, technical and communication skills through participation in a coordinated internship or independent research project. Meets writing-intensive course requirements for environmental geosciences, environmental studies and geography majors.
Prerequisites: Senior classification and enrollment in Geographic Information Science and Technology or approval of instructor.

GEOG 477 Terrain Analysis and Mapping
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Geomorphometry for land surface characterization; fundamentals of terrain analysis; theory of land surface dynamics; application of software for digital terrain modeling and analysis.
Prerequisites: GEOG 361 and GEOG 390 or equivalents, or approval of instructor; junior or senior classification.

GEOG 478 WebGIS
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Investigation of web-based geographic information systems; introduction to server-oriented architectures for web-based applications and services; development of web applications; management of web servers, web services and databases.
Prerequisites: GEOG 390 or equivalent, or approval of instructor; junior or senior classification.

GEOG 479 Principles of Geocomputation
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Geocomputation including geospatial technologies, computational techniques and algorithms utilizing high-performance computing; fundamental geocomputation principles, artificial and computational intelligence.
Prerequisites: GEOG 361, GEOG 390, GEOG 475, CSCE 110 or CSCE 111.
GEOG 484 Internship
Credits 0 to 12. 0 to 12 Lecture Hours.
Directed internship in a private firm, government agency or non-
governmental organization to provide work experience related to the
student's degree program and career objectives.
Prerequisites: Junior or senior classification and approval of internship
agency and departmental internship director.

GEOG 485 Directed Studies
Credits 1 to 23. 1 to 23 Other Hours.
Individually supervised research or advanced study on restricted areas
not covered in regular courses.
Prerequisite: Approval of department head.

GEOG 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of geography. May be repeated for
credit.
Prerequisite: Approval of instructor.

GEOG 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in geography.
May be repeated 2 times for credit. Registration in multiple sections of
this course is possible within a given semester provided that the per
semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

GEOL - Geology (GEOL)

GEOL 101 Principles of Geology
Credits 3. 3 Lecture Hours.
(GEOL 1303, GEOL 1403) Principles of Geology. Physical and chemical
nature of the Earth and dynamic processes that shape it; plate tectonics,
Earth's interior, materials it is made of, age and evolution, earthquakes,
vulcanism, erosion and deposition; introduces physical and chemical
principles applied to the Earth. Not open to students who have taken
GEOL 103 or GEOL 104.

GEOL 102 Principles of Geology Laboratory
Credit 1. 2 Lab Hours.
(GEOL 1103, GEOL 1403) Principles of Geology Laboratory. Laboratory
exercise-based introduction to the physical and chemical nature of the
Earth and dynamic process that shape it; rock and mineral types;
topographic and geologic maps; complements GEOL 101 but may be
taken independently.

GEOL 104 Physical Geology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Earth materials, structures, external and internal characteristics; physical
processes at work upon or within the planet. A working knowledge of high
school chemistry and mathematics is required.

GEOL 106 Historical Geology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(GEOL 1104 and 1304, 1404) Historical Geology. Hypotheses of Earth's
origin; age dating of geologic materials; development and history of life;
plate tectonic reconstructions, geologic history, and paleogeography,
with emphasis on the North American plate.
Prerequisite: GEOL 101 or equivalent.

GEOL 108 Dinosaur Life and Times
Credit 1. 1 Lecture Hour.
Dinosaur paleobiology and paleoecology; terrestrial paleoclimate and
paleoenvironments of the Mesozoic; dinosaur ancestors; appearance and
radiation of dinosaurs; paleoecology and paleobiology of major dinosaur
groups; extinction of large dinosaurs and the Cretaceous-Paleogene
mass extinction; the appearance and ancestry of birds. Not open to
students who have taken GEOL 307.

GEOL 150 Introduction to the Solid Earth
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Introduction to the dynamic earth for careers in geosciences; origin and
structure of the earth; earth materials and processes, particularly as they
relate to plate tectonics; maps as a basic tool of geologists; not open to
students who have taken GEOL 101 or GEOL 104.

GEOL 152 History of the Earth
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Evolution of life, plate tectonics processes, geography and climate
through earth's history; the timing of major events in earth history;
sedimentary environments and stratigraphy; fossils; biostratigraphic
and radiometric dating of rocks; not open to students who have taken
GEOL 106.
Prerequisites: GEOL 150, GEOL 101 and GEOL 102, or GEOL 104 or
equivalent.

GEOL 180 Introduction to Geology and Geophysics
Credit 1. 1 Lecture Hour.
Introduction to careers in geology and geophysics; campus resources
for academic and personal success; tools for developing study skills
and navigating the university; use of reflection to assess personal
strengths, weaknesses and responsibilities and to devise strategies for
improvement.
Prerequisite: Approval of instructor.

GEOL 203 Mineralogy
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Crystallography, crystal chemistry, mineral chemistry, optical
crystallography, physical properties, and geologic occurrence of rock-
forming and economic minerals.
Prerequisites: MATH 151; CHEM 101 and 111 or CHEM 107 and 117;
GEOL 150 or equivalent.

GEOL 210 Geological Communication
Credits 3. 3 Lecture Hours.
Introduction to communicating as a scientist particularly in geological
settings; using precise language, illuminating graphs and correct
mathematical and chemical symbols to describe geological observations
and concepts in writing; using basic statistics to describe geological data
and uncertainty; recognizing scientific ethical dilemmas and plagiarism
and interpretation.
Prerequisites: MATH 151, ENGL 104, GEOL 150 or equivalent.

GEOL 250 Geological Field Methods
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Fundamental aspects of geologic mapping; field observation, data
gathering and recording, use of a Brunton compass, pace-and-compass
mapping, measurement of stratigraphic sections; topographic map use
and interpretation, interpretation of geologic map patterns, construction
of geologic cross sections; integrating field and remote data to address
geologic problems using GIS software.
Prerequisites: GEOL 152 or equivalent.
GEOL 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed studies in specific problem areas of geology.
Prerequisite: Approval of instructor.

GEOL 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of geology. May be repeated for credit.
Prerequisite: Approval of instructor.

GEOL 300 Field Geology
Credits 6. 6 Other Hours.
Basic concepts of field relationships and field techniques are used to develop geologic maps, stratigraphic columns, cross-sections and geologic interpretations for a variety of geologic provinces. Course conducted off-campus in a field camp for six weeks.
Prerequisites: GEOL 302, GEOL 306, GEOL 309, GEOL 312 or approval of instructor.

GEOL 301 Mineral Resources
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Origin, geologic relations and geographic distribution of mineral and energy resources; mineral economics, mining and reclamation and global economics in the resource industry; identification and classification of economic minerals including energy resources, base and precious metals, chemical industrial minerals and gemstones.
Prerequisites: GEOL 101 or GEOL 320; CHEM 106 or higher.

GEOL 302 Introduction to Petrology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Introduction to the origin and evolution of igneous, sedimentary, and metamorphic rocks; classification and petrographic analysis of major rock types; relationships to tectonic settings.
Prerequisites: GEOL 104 and GEOL 203 or approval of instructor.

GEOL 304 Igneous and Metamorphic Petrology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Origin and evolution of igneous and metamorphic rocks; identification, classification and petrographic analysis; relationships to tectonic settings; genetic processes inferred from laboratory studies and field occurrences.
Prerequisites: GEOL 203; CHEM 107 and CHEM 117 or CHEM 102 and 112.

GEOL 305 Paleobiology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles of paleobiology; study of organisms important in the marine fossil record; application of paleontology to geologic problems.
Prerequisite: GEOL 106 or approval of instructor.

GEOL 306 Sedimentology and Stratigraphy
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Origin of sediments and sedimentary rocks; climate, weathering, and weathering products; transport, deposition, and depositional environments for sediments; field and laboratory studies in description and interpretation of genesis of sedimentary rocks; principles of stratigraphy and basin analysis; plate tectonics and the formation of sedimentary basins; stratigraphic nomenclature; geologic time and correlation; sequence stratigraphy and basin architecture.
Prerequisite: CHEM 101 and CHEM 111 or CHEM 107 and CHEM 117; PHYS 218; GEOL 152 or equivalent.

GEOL 307 Dinosaur World
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Evolutionary development of dinosaurs and Mesozoic geography, climate and terrestrial environments including dinosaur morphology; evolutionary relationships; dinosaur metabolism; and constraints imposed by gigantism; their latitudinal distribution; casual mechanism for dinosaur extinction.

GEOL 308 Integrated Earth Science
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Integrated processes shaping Earth's crust, continents, ocean basins, atmosphere and biosphere; place of Earth in the universe; relationship between Earth and human society; related fundamental physical and biological science principles and processes within an integrated Earth science context. Not an elective for students pursuing degrees for careers as professional geologists.
Prerequisite: GEOL 101 or GEOG 203.

GEOL 309 Introduction to Geological Field Methods
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Geological mapping methods, field observation procedures and data gathering and recording; use of Brunton compass; pace-and-compass mapping; topographic map use and interpretation; measurement of structural elements; interpretation of geologic map patterns; measurement of stratigraphic sections; construction of geologic cross sections; six day geologic mapping project during either spring break or two three-day weekends.
Prerequisites: GEOL 101 or GEOL 104; GEOL 106.

GEOL 310 Planetary Geology
Credits 3. 3 Lecture Hours.
Introduction to planetary science; organization and composition of the solar system, including the planets, satellites and asteroids; surface features and internal structures of the terrestrial planets and moons; the dynamic processes of planetary resurfacing, including volcanism, tectonism, weathering and impacts; the history and future of solar system exploration.
Prerequisites: GEOL 101 or 104; junior or senior classification or approval of instructor.

GEOL 311 Principles of Geological Writing
Credit 1. 1 Lecture Hour.
Principles of writing for geological reports; format and style for abstracts, grant proposals, journal manuscripts and industry reports; evaluating written reports for revision and editing; using proper referencing and citation style; methods of maintaining clarity in documents; using web tools for geological communication.
GEOL 312 Structural Geology and Tectonics  
Credits: 4. 3 Lecture Hours. 3 Lab Hours.  
Fundamentals of the deformation of the lithosphere ranging from plate to atomic scales; stress, strain, experimental rock deformation, microscopic mechanisms and mechanical behaviors; analysis of faults, folds, flow and rock fabrics; subsurface interpretation; regional tectonics of selected areas; practical experience in geometric and kinematic analysis, constructing balanced cross sections.  
Prerequisites: GEOL 104 or GEOL 150 or equivalent; MATH 151, MATH 152 and PHYS 218.

GEOL 314 Paleontology and Geobiology  
Credits: 4. 3 Lecture Hours. 3 Lab Hours.  
Biosphere-geosphere interactions, including procaryote controls on sedimentary geochemistry and organismal distributions, and fossil preservation; fossils in the context of evolutionary theory and global change; identification of important groups of marine fossils; use of fossils to determine the stratigraphic age of rocks and the history of life on Earth.  
Prerequisites: CHEM 101 or CHEM 107, or GEOL 152 or equivalent; GEOL 306.

GEOL 316 Team Research in Geology and Geophysics  
Credits: 3. 0 Lecture Hours. 9 Lab Hours.  
Team-based research in geology and geophysics; hypothesis development, data collection, data interpretation; communication of geological/geophysical interpretations and data. May be taken four times for credit.  
Prerequisites: GEOL 203 or concurrent enrollment and approval of instructor.

GEOL 320 Geology for Civil Engineers  
Credits: 3. 2 Lecture Hours. 3 Lab Hours.  
Principles of physical and engineering geology; properties of minerals, rocks and soils; active surface and subsurface processes; applications to the siting, design, construction, operation and maintenance of engineered works and the protection of the environment. A three-day field trip is required (a field trip fee is charged at registration).  
Prerequisite: Sophomore classification.

GEOL 330 Geologic Field Trips  
Credits: 1 to 3. 1 to 3 Other Hours.  
Field trips to observe, analyze and interpret the geology and geophysics of selected localities in Texas and adjacent regions; complements classroom experience. Trip frequencies, duration, dates and study localities vary with semester.  
Prerequisite: GEOL 101 or GEOL 104 or approval of instructor. May be repeated for credit.

GEOL 350 Summer Field Geology  
Credits: 3. 3 Other Hours.  
Intense immersive geologic mapping experience, integrating geological skills from throughout the curriculum; concepts of field relationships and field techniques are used to develop geologic maps, stratigraphic columns, cross-sections and geologic interpretations for a variety of geologic provinces; conduct off-campus in a field area or areas for three to four weeks.  
Prerequisites: GEOL 304, GEOL 314, GEOL 306, GEOL 250 and GEOL 312.

GEOL 352/GEOG 352 GNSS in the Geosciences  
Credits: 3. 2 Lecture Hours. 3 Lab Hours.  
Fundamentals of Global Navigation Satellite Systems (GNSS); basic geodesy, figure of the earth; frames of reference, map projection, datums, ellipsoids; GPS accuracy and precision; applications in earth resource mapping and database creation; elementary GPS phase data processing.  
Prerequisites: Junior or senior classification; approval of instructor.  
Cross Listing: GEOG 352/GEOL 352.

GEOL 400 Reservoir Description  
Credits: 3. 2 Lecture Hours. 3 Lab Hours.  
An integrated reservoir characterization and design experience for seniors in petroleum engineering, geology and geophysics; includes using geophysical, geological, petrophysical and engineering data; emphasis on reservoir description (reservoir and well data analysis and interpretation), reservoir modeling (simulation), reservoir management (production optimization) and economic analysis (property evaluation).  
Prerequisite: Junior or senior classification or approval of instructor.

GEOL 404 Geology of Petroleum  
Credits: 3. 2 Lecture Hours. 3 Lab Hours.  
Origin, migration and accumulation of petroleum; typical U.S. oil and gas fluids; laboratory work in subsurface geology.  
Prerequisites: GEOL 312; senior classification in geology.

GEOL 410 Hydrogeology  
Credits: 3. 2 Lecture Hours. 2 Lab Hours.  
Geologic conditions determining the distribution and movement of ground water and their effect on the hydrologic properties of aquifers.  
Prerequisite: MATH 151 and MATH 152, or equivalent; junior or senior classification.

GEOL 420 Environmental Geology  
Credits: 3. 2 Lecture Hours. 2 Lab Hours.  
Geologic concepts of the nature of geologic environments and the dynamics of geologic processes needed to characterize and quantify human interactions with specific geologic systems including aquifers, watershed, coastlines and wetlands; specific techniques, including geophysical and geochemical techniques, field mapping, geographical information systems and remote sensing used to monitor human-geosphere interactions.  
Prerequisites: GEOL 101 or GEOG 203; junior or senior classification or approval of instructor.

GEOL 440 Engineering Geology  
Credits: 3. 2 Lecture Hours. 3 Lab Hours.  
Fundamentals of soil, rock and fluid mechanics and basic engineering practices as applied to the analysis of the geologic environment for engineering uses. Designed for geoscience majors who have not had engineering courses.  
Prerequisites: GEOL 312 or approval of instructor; PHYS 218.

GEOL 450 Geology Senior Project  
Credits: 3. 3 Lecture Hours.  
Conducting and communicating a team research project in geology and/or geophysics; formulating a research question and a plan to answer that question; synthesizing and interpreting the geological and geophysical literature; written and oral presentation of findings and critiquing those findings.  
Prerequisites: GEOL 210 and GEOL 312, or approval of undergraduate advisor.
GEOL 451 Introduction to Geochemistry
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Chemical principles and processes responsible for the formation and cycling of earth materials, with emphasis on low temperature equilibria and kinetics in rockwater systems.
Prerequisite: GEOL 302 or approval of instructor.

GEOL 478 Earth Science Modeling
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Techniques for building, solving and analyzing numerical models applied to a wide variety of problems in geology, geochemistry, geobiology and geophysics; derivation and scaling of conservation laws; finite difference and finite element techniques; programming in MATLAB or a higher-level language.
Prerequisites: MATH 151; MATH 152; junior or senior classification.

GEOL 484 Internship
Credits 0. 0 Other Hours.
Directed internship in a private firm, government agency or non-governmental organization to provide work experience related to the student's degree program and career objectives. May be taken two times.
Prerequisites: Junior or senior classification and approval of internship agency and approval of instructor.

GEOL 485 Directed Studies
Credits 1 to 12. 1 to 12 Other Hours.
Advanced problems in geology.

GEOL 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of geology. May be repeated for credit.
Prerequisite: Approval of instructor.

GEOP 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in geology. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

GEOP - Geophysics (GEOP)

GEOP 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in geophysics. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Freshman or sophomore classification and approval of instructor.

GEOP 313 Geophysical Field Methods
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Planning, safe execution and analysis of applied geophysical surveying including magnetics, gravity, resistivity, induced polarization, seismic reflection, seismic refraction, ground-penetrating radar, frequency-domain and time-domain electromagnetic induction; experimental design, precise navigation, quality assurance and control, data management, elementary processing, error analysis and estimation, visualization and interpretation procedures.
Prerequisites: GEOP 341, PHYS 208, PHYS 218, MATH 308 and GEOL 250.

GEOP 475 Interpretation of Gravity and Magnetic Fields
Credits 3. 3 Lecture Hours.
Applications of potential theory in the interpretation of gravity and magnetic fields; analysis of geophysical anomalies produced by geologic structures and by variation in the physical properties of rocks; use of regional gradients, residual anomalies, higher derivatives and surfaces, line integrals and two and three dimensional models.
Prerequisites: GEOL 312; MATH 311 or approval of instructor.
GEOP 484 Internship
Credits 0. 0 Other Hours.
Directed internship in a private firm, government agency or non-governmental organization to provide work experience related to the student's degree program and career objectives. May be taken twice.
Prerequisites: Junior or senior classification and approval of internship agency and approval of instructor.

GEOP 485 Directed Studies
Credits 1 to 12. 1 to 12 Other Hours.
Advanced problems in geophysics.

GEOP 489 Special Topics In...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in geophysics. May be repeated for credit.
Prerequisite: Junior or senior classification.

GEOP 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in geophysics. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. 
Prerequisites: Junior or senior classification and approval of instructor.

GEOS - Geosciences (GEOS)

GEOS 101 Introduction to the Geosciences
Credit 1. 1 Lecture Hour.
Introduction to the geosciences: geography, geology, geophysics, atmospheric sciences and oceanography; areas and opportunities in the various geoscience fields. Open to all freshman and sophomore non-geoscience students interested in geosciences.

GEOS 105 Introduction to Environmental Geoscience
Credits 3. 3 Lecture Hours.
Key concepts and generalizations of global environmental issues within an Earth systems science framework including climate change, air pollution, land and coastal degradation, water resources and pollution, and habitat loss; environmental ethics, economics and politics; environmental issues in Texas. Enrollment preference will be given to environmental geoscience and environmental studies majors.

GEOS 205 Environmental Geosciences Cornerstone
Credit 1. 1 Lecture Hour.
Professional career options, methods, strategies and skills involved in successful career planning in the environmental sciences; highlights high impact learning opportunities such as study abroad and internships and the development of scientific communication skills. 
Prerequisites: ENST and ENGS majors; sophomore classification or approval of instructor.

GEOS 210 Climate Change
Credits 3. 3 Lecture Hours.
Examination of the science of climate change; how greenhouse gases warm the planet; scientific evidence that the earth is warming; scientific evidence that humans are causing this warming; what warming we can expect in the future and impacts of that warming.

GEOS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
.. Selected topics in an identified area of geosciences. May be repeated for credit.
Prerequisite: Approval of instructor.

GEOS 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in the College of Geosciences. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Freshman or sophomore classification and approval of instructor.

GEOS 301 College of Geosciences Study Abroad
Credits 1 to 18. 1 to 18 Other Hours.
For students in approved programs abroad. May be repeated for credit. 
Prerequisites: Admission to approved program and approval of academic dean.

GEOS 401 Polar Regions of the Earth: Science, Society and Discovery
Credits 3. 3 Lecture Hours.
Overview of disciplines and topics that define modern polar science in the north and the south; includes history of the Polar Regions, polar geosciences, major polar scientific projects, and special topics; participate as individuals and teams in education, outreach and science projects.
Prerequisite: Junior or senior classification.

GEOS 405 Environmental Geosciences
Credits 3. 2 Lecture Hours. 2 Lab Hours.
The interaction of the earth, atmosphere, oceans, cryosphere and life, including the impact of human society on the environment and climate; global change modeling; politics, policy and decision making; and personal awareness.

GEOS 430 Global Science and Policy Making
Credits 3. 3 Lecture Hours.
The interaction of the earth, atmosphere, oceans, cryosphere and life, including the impact of human society on the environment and climate; global change modeling; politics, policy and decision making; and personal awareness.

GEOS 431 Environmental Regulatory Compliance in Geoscience
Credits 3. 3 Lecture Hours.
Knowledge and practical experience necessary for analyzing and evaluating environmental protection and stewardship principles; application of evolving environmental laws and regulations to the human business enterprise; exploration of the interplay between stakeholders in the development of sound environmental management and regulatory strategies.
Prerequisites: BESC 367 or approval of instructor; junior or senior classification.
GEOS 442/GEOG 442 Past Climates  
Credits 3. 3 Lecture Hours.  
Terrestrial and marine proxy records of past climate variability, including tree rings, coral, and sediments; past climate change events such as the Little Ice Age and Medieval Warm Period; greenhouse gases and global temperature; insight into the nature of climate change and challenges humankind faces in the next few centuries.  
Prerequisites: ATMO 201, or GEOG 203, or GEOL 101, or GEOL 104, or OCNG 251; junior or senior classification.  
Cross Listing: GEOG 442/GEOS 442.

GEOS 444 The Science and Politics of Global Climate Change  
Credits 3. 3 Lecture Hours.  
Examination of the policy and scientific debate over climate change; how scientific debates produce "knowledge"; how political debates produce policies; how policy debates use science; scientific evidence for climate change; impacts of climate change; possible responses to climate change; the political debate over climate change.  
Prerequisite: GEOS 210; junior or senior classification or approval of instructor.

GEOS 470 Data Analysis Methods in Geosciences  
Credits 3. 3 Lecture Hours.  
Research methods from conceptualization of a scientific problem to data collection, analysis, and visualization; basic data analysis methodologies in the geosciences; emphasis on real-world applications from environmental, atmospheric, and oceanographic sciences.  
Prerequisites: Junior or senior classification; MATH 151 and STAT 303 or concurrent enrollment, or approval of instructor.

GEOS 481 Seminar  
Credit 1. 1 Other Hour.  
Acquaint students with current research themes in the environmental field. May be repeated 4 times for credit.  
Prerequisite: Junior or senior classification.

GEOS 484 Internship  
Credits 0 to 6. 0 to 6 Other Hours.  
Provides opportunity to gain practical experience in a working situation either during the semester or summer; work experience must have relevance to the degree sought and/or career objectives. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisite: Junior or senior classification and approval of internship agency and departmental director.

GEOS 485 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Advanced problems in geosciences.

GEOS 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of geosciences. May be repeated for credit.

GEOS 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of a faculty member in the College of Geosciences. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.

GERM - German (GERM)  

GERM 101 Beginning German I  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
(GERM 1411) Beginning German I. Elementary language study with oral, written and reading practice. Preparation for conversation. Part of class preparation will be done in language laboratory.

GERM 102 Beginning German II  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
(GERM 1412) Beginning German II. Continuation of GERM 101. Part of class preparation will be done in language laboratory.  
Prerequisite: GERM 101.

GERM 104 Intensive Beginning German  
Credits 8. 8 Lecture Hours. 0 Lab Hours.  
Accelerated elementary language study, with oral, listening, reading, and writing practice. Equivalent to GERM 101 and GERM 102.

GERM 201 Intermediate German I  
Credits 3. 3 Lecture Hours.  
(GERM 2311) Intermediate German I. Readings of average difficulty; review of grammar; practice in conversation composition.  
Prerequisite: GERM 102 or GERM 104.

GERM 202 Intermediate German II  
Credits 3. 3 Lecture Hours.  
(GERM 2312) Intermediate German II. Continuation of GERM 201 with more advanced material. Some literary selections included in class readings.  
Prerequisite: GERM 201.

GERM 204 Intensive Intermediate German  
Credits 6. 6 Lecture Hours.  
Accelerated intermediate-level language study, with oral, listening, reading, and writing practice. Equivalent to GERM 201 and GERM 202.  
Prerequisite: GERM 102 or GERM 104.

GERM 221 Field Studies I  
Credits 3. 3 Other Hours.  
German language and culture taught in Germany; supervised travel of cultural interest; living with local families; participation in the activities and courses of a German university or institute; written and oral reports, exams.  
Prerequisites: GERM 102 or GERM 104; concurrent enrollment in GERM 222.

GERM 222 Field Studies II  
Credits 3. 3 Other Hours.  
German language and literature taught in Germany in cooperation with a German university or institute; exams, written reports.  
Prerequisites: GERM 102 or GERM 104; concurrent enrollment in GERM 221.

GERM 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Individual supervision of readings or assigned projects in German, selected for each student individually.  
Prerequisite: Approval of instructor and department head.

GERM 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of German. May be repeated for credit.  
Prerequisite: Approval of instructor.
GERM 310 Composition
Credits 3. 3 Lecture Hours.
Development of writing skills in German; emphasis on grammatical construction; taught in German.
Prerequisites: GERM 202, GERM 204, or GERM 222; junior or senior classification or approval of instructor.

GERM 311 Conversation
Credits 3. 3 Lecture Hours.
Development of effective communication skills in spoken German, with emphasis on language appropriate to various social context; taught in German.
Prerequisite: GERM 202, GERM 204, or GERM 222; junior or senior classification or approval of instructor.

GERM 315 Literary Investigations: German Short Fiction
Credits 3. 3 Lecture Hours.
Readings of selected works of short prose from the early 20th century to the present with emphasis on principles of literary analysis; conducted in German.
Prerequisite: GERM 202, GERM 204, or GERM 222; junior or senior classification or approval of instructor.

GERM 316 Advanced Business German
Credits 3. 3 Lecture Hours.
Continuation of GERM 203; reading and oral practice of German pertinent to business, trade and international commerce.
Prerequisite: GERM 202, GERM 204, or GERM 222; junior or senior classification or approval of instructor.

GERM 321 German Culture and Civilization I
Credits 3. 3 Lecture Hours.
German culture and civilization from classical antiquity to 1830; major stylistic periods in literature and the fine arts; conducted in German.
Prerequisite: GERM 202, GERM 204, or GERM 222; junior or senior classification or approval of instructor.

GERM 322 German Culture and Civilization II
Credits 3. 3 Lecture Hours.
German culture and civilization from 1830 to the present; conducted in German.
Prerequisite: GERM 202, GERM 204, or GERM 222; junior or senior classification or approval of instructor.

GERM 331 German Literary Expression I
Credits 3. 3 Lecture Hours.
Readings of selected drama, poetry, and prose works of German literature from the Middle Ages through Romanticism; problems involved in defining dramatic, lyric, and epic genres considered; structural and aesthetic elements of literary works; conducted in German.
Prerequisite: GERM 310 or GERM 315, or registration therein.

GERM 332 German Literary Expression II
Credits 3. 3 Lecture Hours.
Readings of selected drama, poetry, and prose works of German literature of the modern era; problems involved in defining dramatic, lyric, and epic genres considered; structural and aesthetic elements of literary works; conducted in German.
Prerequisite: GERM 310 or 315, or registration therein.

GERM 333 Contemporary Germany
Credits 3. 3 Lecture Hours.
Social, political, and economic debates and issues in Germany from 1945 to the present through the arts (literature, film, video, music); focus on post-war reconstruction, divided Germany, and post-reunification periods; conducted in German.
Prerequisites: GERM 310 or GERM 315, or registration therein.

GERM 334 German Drama
Credits 3. 3 Lecture Hours.
Study, analysis and public presentation in German of a major German dramatic work; literary theory and intensive conversational practice combined with skills of language acquisition within a performance setting.
Prerequisite: GERM 310 or GERM 315, or registration therein.

GERM 336 German Fairy Tales
Credits 3. 3 Lecture Hours.
Examination of the work of a specific author, such as Goethe, Schiller, Kafka, Brecht, Frisch, or Grass, or the diachronic study of a specific genre, e.g., poetry, drama, prose; taught in German. May be taken two times.
Prerequisite: 6 hours in GERM at 300-level, or approval of instructor.

GERM 341 German Author and Genre Studies
Credits 3. 3 Lecture Hours.
Examination of the work of a specific author, such as Goethe, Schiller, Kafka, Brecht, Frisch, or Grass, or the diachronic study of a specific genre, e.g., poetry, drama, prose; taught in German. May be taken two times.
Prerequisite: 6 hours in GERM at 300-level, or approval of instructor.

GERM 410 Seminar in German Literature and Culture
Credits 3. 3 Lecture Hours.
Survey of major literary and intellectual landmarks of a period in German history (Enlightenment, Romanticism, High Modernism, post-1945); study of literary works in context of social and cultural history, with attention to Germany’s particular place in Europe and the world; taught in German. May be taken two times.
Prerequisite: 6 hours in GERM at 300-level, or approval of instructor.

GERM 411 German Author and Genre Studies
Credits 3. 3 Lecture Hours.
Examines Life and Thought of Martin Luther; study of the Protestant Reformation in Germany from theological, political, and social perspectives; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.

GERM 434 Martin Luther and the Reformation in Germany
Credits 3. 3 Lecture Hours.
The life and thought of Martin Luther; study of the Protestant Reformation in Germany from theological, political, and social perspectives; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
GERM 435/FILM 435 German Film
Credits 3. 3 Lecture Hours.
Consideration and analysis of major works and directors of German Film; interpretation of culture through film; relationship of film to history, literature, and other arts; taught in English. May be repeated for credit.
Prerequisites: Junior or senior classification, or approval of instructor.
Cross Listing: FILM 435/GERM 435.

GERM 437 German Romanticism: Literature, Theory, Philosophy
Credits 3. 3 Lecture Hours.
From Goethe's "Faust" to the romantic exaltation of poetry; influence of the romantic movement on European literary theory and philosophy; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: EURO 437/GERM 437.

GERM 440 Global Germany
Credits 3. 3 Lecture Hours.
Impact of globalization on Germany and the globalization of German life and culture from postwar period to the present; analysis of theoretical, historical, fictional and/or cinematic works presenting relationship of modern Germany with world affairs. Course conducted in English.
Prerequisite: Junior or senior classification or approval of instructor.

GERM 441 Representations of the Holocaust
Credits 3. 3 Lecture Hours.
Analysis of artistic mediations of the Holocaust across diverse textual and visual media with particular focus on aesthetic, political, pedagogical, and ethical challenges. Course conducted in English.
Prerequisite: Junior or senior classification or approval of instructor.

GERM 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports.
Prerequisite: Approval of instructor and department head.

GERM 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of German. May be repeated for credit.
Prerequisite: Approval of instructor.

GERM 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in German. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of department head.

HBRW - Hebrew (HBRW)

HBRW 101 Elementary Modern Hebrew I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Elementary language study with oral, written and reading practice; preparation for conversation; part of class preparation to be done in the language laboratory.

HBRW 102 Elementary Modern Hebrew II
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Continuation of HBRW 101; part of class preparation to be done in the language laboratory.
Prerequisite: HBRW 101.

HBRW 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Individual supervision of readings or assigned projects in Hebrew, selected for each student individually.
Prerequisites: Approval of instructor and department head.

HBRW 289 Special Topics In...
Credits 3. 3 Lecture Hours.
Selected topics in an identified area of Hebrew studies. May be repeated for credit.
Prerequisite: Approval of instructor.

HEFB - Health Ed Field Based (HEFB)

HEFB 222/KNFB 222 Teaching and Schooling in Modern Society
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Developing an understanding of students in multiple settings and levels; development, structure, history, finance, and management of schools in a democratic society; philosophical, ethical and moral dimensions of teaching; professional role of teacher.
Prerequisites: Junior or senior classification; majors only.
Cross Listing: KNFB 222/HEFB 222.

HEFB 324/KNFB 324 Technology and Teaching Skills for the 21st Century Learner
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Preparation of future Health and Physical Education teachers with practical skills related to: technology in the classroom/gymnasium, strategies for addressing urban education and English language learners, liability, management and classroom discipline, development of professional communication skills and time management; includes field based experiences in diverse classroom settings.
Prerequisites: HEBF 222/KNFB 222 or KNFB 222/HEFB 222; admission to professional phase of program.
Cross Listing: KNFB 324/HEFB 324.

HEFB 325/HEFB 325 Introduction to Secondary School Teaching
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduce fundamental teaching skills and theories necessary for preparing reflective teachers; examine classroom management, learning strategies and assessment techniques; classroom lectures combined with field-based experiences to link theory into practice.
Prerequisites: HEBF 222/KNFB 222 or KNFB 222/HEFB 222; admission to professional phase of program; junior or senior classification.
Cross Listing: HEBF 325/HEFB 325.

HEBF 450/KNFB 450 Supervised Student Teaching
Credits 6. 0 Lecture Hours. 6 Other Hours.
Observation and participation in an accredited public school classroom; techniques of teaching student's teaching fields, and appropriate instructional strategies for assigned student population.
Prerequisites: Admission to professional phase of program and to student teaching; junior or senior classification.
Cross Listing: KNFB 450/HEFB 450.
HISP - Hispanic Studies (HISP)

HISP 201 Current Issues in Hispanic Studies
Credit 1. 1 Lecture Hour.
Exploration of current issues and concerns in Hispanic Studies through attendance and participation in Hispanic Studies-related events and lectures by noted academics and professionals in Hispanic Studies; in-class discussions. May be taken three times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: ENGL 104.

HISP 204 Spanish and Spanish American Literature in Translation
Credits 3. 3 Lecture Hours.
Survey of literature from the Spanish-speaking world from the Middle Ages to the present; English translations of masterpieces of Spanish language literature; authors such as Cervantes, Lope de Vega, Dario, Garcia Marquez. Taught in English.

HISP 205 Don Quixote and the Other Arts
Credits 3. 3 Lecture Hours.
A study of Miguel de Cervantes’ masterwork, Don Quixote, and its representations in other arts such as painting, film and music. Taught in English.

HISP 206 Food in the Hispanic World
Credits 3. 3 Lecture Hours.
A study of food, food preparation and consumption in the Hispanic world from historical, geographical, artistic, social and psychological perspective. Taught in English.

HISP 250 Contemporary Spanish Culture
Credit 1. 1 Lecture Hour.
Cultural and practical orientation for students participating in the summer study abroad programs in Spain; brief introduction to contemporary social and cultural institutions; discussions of Spanish university system; oral reports and final paper; readings and discussion in English and Spanish.
Prerequisite: SPAN 101 or equivalent.

HISP 260 Contemporary Mexican Culture
Credit 1. 1 Lecture Hour.
Introduction to contemporary Mexican social, cultural, and political institutions; discussion of Mexican university system; readings and discussion in Spanish and English. For preparation for study abroad program in Mexico.
Prerequisite: SPAN 101 or equivalent.

HISP 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Individual supervision of readings or assigned projects in Hispanic Studies, selected for each student individually.
Prerequisites: Approval of instructor and department head.

HISP 289 Special Topics In...
Credits 3. 3 Lecture Hours.
Selected topics in an identified area of Hispanic Studies. May be taken three times for credit.
Prerequisites: ENGL 104; freshman or sophomore classification; approval of department head.

HISP 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research in Hispanic Studies conducted under the direction of faculty member. May be taken two times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

HISP 352 Hispanic Literature and Film
Credits 3. 3 Lecture Hours.
The language of film, and film as fiction; the relationship between film and literature; films as expressions of cultural realities through the adaptation of Hispanic literary works; readings and lectures in English.

HISP 362/ENGL 362 Latino/a Literature
Credits 3. 3 Lecture Hours.
Literature by U.S.-based Latino/a authors writing mostly in English; examination of historical and social contexts of cultural production; may include novels, poetry, short stories, plays, and films to gain understanding of aesthetic expression of diverse Latino/a authors, including but not limited to Mexican Americans, Puerto Ricans, Cuban Americans and Dominican Americans.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 362/HISP 362.

HISP 363 Borderlands: U.S. and Mexico
Credits 3. 3 Lecture Hours.
Multiple images of the U.S./Mexico border, their creation, their evolution, and their conflicting representations in filmic, literary and musical texts.
Prerequisites: ENGL 104 and junior or senior classification.

HISP 471/RELS 471 Hispanic Religions
Credits 3. 3 Lecture Hours.
Exploration of the history and practice of Hispanic religion, including spirit possession, evil eye, consumption of sacred substances, healing traditions, ex-votos, relics, prophecy, omens, monsters, astrology, witchcraft, the Inquisition, festivals, pilgrimage, mystics and religious contributions of diverse ethnic groups.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: RELS 471/HISP 471.

HISP 474/RELS 474 Diversity Lessons from Medieval Spain
Credits 3. 3 Lecture Hours.
Crucible of cultures--Christian, Jewish, and Muslim--that was medieval Spain and modern implications of that experience in diversity.
Prerequisites: ENGL 104 and junior or senior classification.
Cross Listing: RELS 474/HISP 474.

HISP 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Individual supervision of readings or assigned projects in Hispanic Studies, selected for each student individually.
Prerequisites: Junior or senior classification; approval of instructor and department head.

HISP 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of Hispanic studies. May be taken three times for credit.
Prerequisites: ENGL 104; junior or senior classification; approval of department head.

HISP 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research in Hispanic Studies conducted under the direction of faculty member. May be taken two times for credit.
Prerequisites: Junior or senior classification and approval of instructor.
HIST - History (HIST)

HIST 101 Western Civilization to 1660
Credits 3. 3 Lecture Hours.
(HIST 2311) Western Civilization to 1660. Ancient civilizations, Greek, Roman and Asian, Christianity; medieval civilization in west, eastern Europe; political, social and intellectual developments from earliest human cultures to 1660.

HIST 102 Western Civilization Since 1660
Credits 3. 3 Lecture Hours.
(HIST 2312) Western Civilization Since 1660. Religious, dynastic and imperial developments; Industrial Revolution; western democracies; rise of nationalism and communism; central and eastern Europe; intellectual revolution; World Wars I and II and the contemporary world.

HIST 103 World History to 1500
Credits 3. 3 Lecture Hours.
(HIST 2321) World History to 1500. Development of major world societies in the premodern era; emergence of agrarian-based modes of production, political states, religious economy and a global division of systems; Eurasian world system and the civilizations of Africa and the Americas.

HIST 104 World History Since 1500
Credits 3. 3 Lecture Hours.
(HIST 2322) World History Since 1500. Interaction of major world societies in the modern era; emergence of the modern world-economy and a global division of labor; European imperialism and colonialism and reactions in Africa, Asia and Latin America.

HIST 105 History of the United States
Credits 3. 3 Lecture Hours.
(HIST 1301) History of the United States. Colonial heritage; Revolution; adoption of Constitution; growth of nationalism and sectionalism; Civil War; Reconstruction.

HIST 106 History of the United States
Credits 3. 3 Lecture Hours.
(HIST 1302) History of the United States. Since reconstruction; new social and industrial problems; rise of progressivism; U.S. emergence as a world power; World War I; reaction and New Deal; World War II; contemporary America.

HIST 107 Introduction to the Health Humanities
Credits 3. 3 Lecture Hours.
Introduction to the methods and approaches of the health humanities; exposure to key scholarship in this field as well as major methods and approaches; application of such skills to the analysis of cultural case studies such as illness narratives or contemporary debates in scientific bioethics.
Cross Listing: COMM 107, ENGL 107, and HHUM 107.

HIST 210 Russian Civilization
Credits 3. 3 Lecture Hours.
Russian history, culture and society from origins to the present; rise of the Russian Empire; autocracy; modernization without liberalization; reforms, reaction, revolution; development of Communist regime; continuity from Imperial to Soviet period in industrialization, bureaucracy and treatment of peasants, nationalities and intellectual opposition; Gorbachev and a new "revolution.

HIST 213 History of England
Credits 3. 3 Lecture Hours.
British, Saxon and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament.

HIST 214 History of England
Credits 3. 3 Lecture Hours.
Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the 20th century; growth of Empire until World War II.

HIST 220 History of Christianity: Origins to the Reformation
Credits 3. 3 Lecture Hours.
History of Christian doctrine, ecclesiastical organization, and religious practice, origins through Reformation, with emphasis on religion and society; life and teachings of Jesus; apostolic church; patristic period; Christianization of Roman Empire and northern Europe; monasticism; medieval church; Gregorian reform; heresy; papal monarchy; schism and conciliarism; reformations of the sixteenth century.
Cross Listing: CLAS 220 and RELS 220.

HIST 221/RELS 221 History of Islam
Credits 3. 3 Lecture Hours.
(HIST 2301) History of Texas. History of Texas from Spanish period to present day. Stress placed upon period of Anglo-American settlement, revolution, republic and development of modern state.

HIST 226 History of Texas
Credits 3. 3 Lecture Hours.
(HIST 2301) History of Texas. History of Texas from Spanish period to present day. Stress placed upon period of Anglo-American settlement, revolution, republic and development of modern state.

HIST 230 American Military History, 1609 to Present
Credits 3. 3 Lecture Hours.
Main events, personalities and technologies related to American military history.

HIST 232 History of American Sea Power
Credits 3. 3 Lecture Hours.
Development of American sea power from the 18th century to the present.

HIST 234 European Military History
Credits 3. 3 Lecture Hours.
Includes societal involvement, democratization of war, technology, strategy, military thought and campaigns.

HIST 242 United States Maritime History
Credits 3. 3 Lecture Hours.
Development of American maritime history from colonial times to the present.

HIST 258 American Indian History
Credits 3. 3 Lecture Hours.
Survey of American Indian history; Pre-Columbian, First Contact, Colonial Conquest, Differentiation between cultural groups; Reservation period, twentieth-century self-determination, and Pan-Indianism.

HIST 280 The Historian's Craft
Credits 3. 3 Lecture Hours.
The Historian's Craft. The world of the professional historian; meanings and uses of history; current debates; archival research; evidence and argumentation; principles and methods of the analytical narrative.

HIST 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Selected fields of history not covered in depth by other courses. Reports and extensive reading required.
Prerequisite: Approval of department head.
HIST 289 Special Topics in...
Credits 3. 3 Other Hours.
Selected topics in an identified area of history. May be repeated for credit.
Prerequisite: Approval of instructor.

HIST 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in history.
Prerequisites: 24 hours if history, with 12 or more at 200-level or above; freshman or sophomore classification and approval of instructor.

HIST 300/AFST 300 Blacks in the United States, 1607-1877
Credits 3. 3 Lecture Hours.
Blacks in the United States from the colonial period to 1877; the slave trade, slavery, free blacks and the impact of the Civil War and Reconstruction on blacks.
Prerequisite: Junior or senior classification.

HIST 301/AFST 301 Blacks in the United States Since 1877
Credits 3. 3 Lecture Hours.
Blacks in the United States from the end of Reconstruction to the present; the ideologies of black leaders, disfranchisement, lynching and the quest for equality in the 1950s and 1960s.
Prerequisite: Junior or senior classification.

HIST 302 Women and War in the African Diaspora
Credits 3. 3 Lecture Hours.
Case studies of women and war in the African diaspora in a wide historical and comparative context; social, economic, and cultural influence of war on women’s lives; women as victims, combatants, and refugees; historical construction of race, ethnic and gender identity during times of conflict.
Prerequisite: Junior or senior classification.

HIST 304 Mexican-American Frontier to 1848
Credits 3. 3 Lecture Hours.
Origins and development of Spanish and Mexican history of Greater Southwest; exploration and conquest; Spanish entradas into Southwest; rise of institutions and colonial society; economic history; Mexican independence; Mexico’s far northern frontier, 1821-1848.
Prerequisite: Junior or senior classification.

HIST 305 Mexican-American History 1848-Present
Credits 3. 3 Lecture Hours.
Social, economic and political evolution of Mexican Americans from 1848 to present; adaptation to a harsh and isolated frontier; land tenure systems; conflict in the new Southwest; change and continuity in society; immigration and settlement of Mexicans; emergence of various political movements; current issues.

HIST 307 Latino Communities of the U.S.
Credits 3. 3 Lecture Hours.
Hispanic or "Latino" communities of 20th century U.S.: Mexican Americans, Puerto Ricans, Cubans and Central Americans; differences in historical experiences; role of race, class, and gender; cultural identity as expressed in art, literature, folklore and religion; contemporary social, political, and economic issues.

HIST 308 History of American Indians in the U.S. South
Credits 3. 3 Lecture Hours.
Examination of the role of indigenous populations in the history and formation of the U.S. South; cultural values and social practices; impact of European exploration and African slavery; trade patterns, imperial wars, and removal policies.
Prerequisite: Junior or senior classification.

HIST 316 Latino/a Labor in the United States
Credits 3. 3 Lecture Hours.
The experience of Latino/a labor in the United States, from the 19th through the early 21st century; role of gender, race and ethnicity and policy on labor experiences and labor relations; intersections of labor and migration, globalization.
Prerequisite: Junior or senior classification.

HIST 319 U.S. Immigration and Ethnicity
Credits 3. 3 Lecture Hours.
The sources and persistence of ethnic identity in 19th and 20th century America; its interaction with religion, politics, languages, education and social mobility; various nativist and anti-immigrant movements; contrasts and continuities between contemporary immigration patterns and those of earlier eras.

HIST 320 History of the Atlantic World
Credits 3. 3 Lecture Hours.
Introduction to the comparative study of the civilizations and cultures that bordered on the Atlantic Ocean; examination of culture and economic exchanges and adaptations, migrations, empire-building, and the emergence of new societies and cultures.
Prerequisite: Junior or senior classification.

HIST 321 The Age of Revolution in the Atlantic World
Credits 3. 3 Lecture Hours.
Origins and events of the revolutions that transformed the Atlantic empires of Great Britain, France, and Spain in the late eighteenth and nineteenth centuries; disruption of old political and economic orders; creation of independent states in the Americas.
Prerequisite: Junior or senior classification.

HIST 322 History of the Iberian World
Credits 3. 3 Lecture Hours.
Introduction to the people and places of the Iberian World, ca. 1500-1900; social, political and economical relations between Spain, Portugal, Asia and the Americas; emergence of a shared culture and cross-cultural exchange.
Prerequisite: Junior or senior classification.

HIST 325 Texas Cultural History
Credits 3. 3 Lecture Hours.
The image of Texas history, tradition and popular culture from the 19th century to the present.
Prerequisite: HIST 226 or ANTH 201, ANTH 210 or ANTH 229.

HIST 326 History of the Caribbean to Emancipation
Credits 3. 3 Lecture Hours.
History of the Caribbean region from human settlement to the late nineteenth century; indigenous peoples; European colonization; colonial societies; challenges to the imperial plantation model.
Prerequisite: Junior or senior classification.
HIST 327 History of the Caribbean Since Emancipation  
Credits 3. 3 Lecture Hours.  
History of the Caribbean region from the late nineteenth century to the present; links to earlier plantation societies; economic, cultural, social, and political developments.  
Prerequisite: Junior or senior classification.

HIST 330 Women in Ancient Greece and Rome  
Credits 3. 3 Lecture Hours.  
Survey of women in classical Greece and Rome; emphasizes on female occupations and family relationships, legal and political status, traditional values, notorious women, how women were viewed and how they viewed themselves.  
Prerequisite: Junior or senior classification.  
Cross Listing: CLAS 330 and WGST 330.

HIST 331 Medieval Europe, 300 to 1300  
Credits 3. 3 Lecture Hours.  
European political and diplomatic history from Constantine to Philip the Fair; emergence of medieval institutions; the influence of Plato and Aristotle upon Augustine, Abelard and Thomas Aquinas, and the origins of European education and law.

HIST 332 Renaissance and Reformation Europe, 1300 to 1660  
Credits 3. 3 Lecture Hours.  
Renaissance politics and diplomacy; political ideas of Erasmus and Machiavelli; art and humanism of the Renaissance; religious views of Luther, Calvin and Zwingli; the "new" economics.

HIST 333 Europe in the Age of Absolutism, 1660-1815  
Credits 3. 3 Lecture Hours.  
Europe from the "Age of Louis XIV" to the Congress of Vienna; Russia, Austria and Prussia. Mercantilism, capitalism and the rise of the middle class. Origins and consequences of the Enlightenment.

HIST 334 History of Europe in the Nineteenth Century  
Credits 3. 3 Lecture Hours.  
Cultural, economic, and political processes that shaped European civilization (east and west); the Napoleon era; industrialization and urbanization; liberalism and socialism; empire and revolution; cultural developments.  
Prerequisite: Junior or senior classification.

HIST 335 Europe, 1890-1932  
Credits 3. 3 Lecture Hours.  
A political, diplomatic, social and cultural history of Europe prior to, during and shortly after World War I.

HIST 336 Europe Since 1919  
Credits 3. 3 Lecture Hours.  
A political, diplomatic, military, economic, social and cultural history of Europe since World War I.  
Prerequisite: Junior or senior classification or approval of instructor.

HIST 337 War and European Society in the Twentieth Century  
Credits 3. 3 Lecture Hours.  
War and social change in Europe during the twentieth century; relationships between front lines and home fronts; government and civil society; gender and war; ethnic and national identities in Eastern, Central, and Western Europe.  
Prerequisite: Junior or senior classification.

HIST 338 The Rise of the European Middle Class  
Credits 3. 3 Lecture Hours.  
Survey of European society and social classes from the origins of capitalism in the Middle Ages to the triumph of the "middle class world" in the 19th century; rise of the middle class, development of bourgeois ideology and culture, and creation of the working class.

HIST 339 Eastern Europe Since 1453  
Credits 3. 3 Lecture Hours.  
Eastern Europe from the fall of the Byzantine Empire to the present; the Ottoman, Habsburg, Russian and Soviet Empires; the origins of modern East European states.

HIST 341 Latin America to 1810  
Credits 3. 3 Lecture Hours.  
Political history of South America from exploration and settlement to independence; colonial institutions; commercial systems.  
Prerequisite: Junior or senior classification.

HIST 342 Latin America Since 1810  
Credits 3. 3 Lecture Hours.  
Political history of independent South American nations since independence with emphasis upon ABC countries; economic, social and cultural development; foreign relations.  
Prerequisite: Junior or senior classification.

HIST 343 Inter-American Relations  
Credits 3. 3 Lecture Hours.  
Cultural, diplomatic and economic relations in the Western Hemisphere in historical perspective.  
Prerequisite: Junior or senior classification or approval of instructor.

HIST 344/AFST 344 History of Africa to 1800  
Credits 3. 3 Lecture Hours.  
Origins of humankind in Africa; development and spread of pastoralism, agriculture and iron-working; formation of states and empires; impact of Christianity and Islam; rise of international trade in gold, ivory and slaves; African diaspora.  
Prerequisite: Junior or senior classification.  
Cross Listing: AFST 344/HIST 344.

HIST 345/AFST 345 Modern Africa  
Credits 3. 3 Lecture Hours.  
Survey of Africa since 1800; pre-colonial African states and societies; establishment and impact of European colonial rule; rise of nationalist movements; achievement of independence; problems of political stability and economic development in contemporary Africa; South Africa's apartheid regime and its opponents.  
Prerequisite: Junior or senior classification.  
Cross Listing: AFST 345/HIST 345.

HIST 346/AFST 346 History of South Africa  
Credits 3. 3 Lecture Hours.  
Selected themes in the history of South Africa from the African Iron Age to the Apartheid regime; history of race relations in the 19th and 20th centuries and the rise of a modern industrial state.  
Cross Listing: AFST 346/HIST 346.

HIST 347/RELS 347 Rise of Islam, 600-1258  
Credits 3. 3 Lecture Hours.  
Introduction to Islamic civilization from the rise of Islam to the Mongol conquests; examination of pre-Islamic poetry, the Qur'an, early Islamic laws on prayer, the ethical conventions of jihad, the lives of Muslim women, and the relation of Islam to Judaism and Christianity.  
Prerequisite: Junior or senior classification.  
Cross Listing: RELS 347/HIST 347.
### HIST 348 Modern Middle East
**Credits**: 3.3 **Lecture Hours.**
Survey of the Middle East since 1800; introduction to Islam and Islamic civilization; decline of the Ottoman Empire; European imperialism; rise of nationalist movements; Zionism and the emergence of Israel; Arab-Israeli conflict; impact of oil; revolution in Iran and Islamic resurgence.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 349/HIST 349 The Vietnam War/The American War
**Credits**: 3.3 **Lecture Hours.**
Vietnam’s relations with the West; French colonialism; origins and development of Vietnamese nationalism; Cold War and American involvement; wartime societies in North and South Vietnam; expansion of the war to Cambodia and Laos; anti-war movements in the United States; reasons for American defeat; consequences and lessons of the war.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 350/HIST 350 World War II in Asia and the Pacific
**Credits**: 3.3 **Lecture Hours.**
Origins and development of Japanese imperialism; Japan’s expansion into East and Southeast Asia and the Pacific; wartime societies; collaboration and resistance; effects of the war in the United States on Japanese-Americans; outcomes of the war; remembrance of the war.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 351/HIST 351 Traditional East Asia
**Credits**: 3.3 **Lecture Hours.**
History and culture of China and Japan from earliest times to the coming of the West; impact of Confucianism and Buddhism; development of social, political and economic systems.

### Cross Listing:
ASIA 352/HIST 352 Modern East Asia
**Credits**: 3.3 **Lecture Hours.**
Impact of the West on traditional China and Japan; the response through modernization; rise of nationalism and formation of modern nation states.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 353/HIST 353 Modern South Asia
**Credits**: 3.3 **Lecture Hours.**
Evolution of cultures, politics and societies in Indian sub-continent from c. 1500 to present; rise and demise of empires (especially Mughal and British); anti-colonialism and emergence of nation states; social and cultural struggles and debates.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 354/HIST 354 Imperial China
**Credits**: 3.3 **Lecture Hours.**
History of imperial China from the earliest dynasties through the mid-19th century, including major political events, the structure of Chinese government, economic development, philosophies and religion, wars and military and culture and daily life.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 355/HIST 355 Modern China
**Credits**: 3.3 **Lecture Hours.**
History of China from the coming of the West to the present; social, economic and political changes which have taken place during that period.
**Cross Listing**: ASIA 355/HIST 355.

### HIST 355/ASIA 356 Twentieth Century Japan
**Credits**: 3.3 **Lecture Hours.**
Industrialization and modernization of Japan; its rise from an isolated nation to a major world power and economic giant.
**Cross Listing**: ASIA 356/HIST 356.

### HIST 357/AFST 357 Out of Africa: The Black Diaspora and the Modern World
**Credits**: 3.3 **Lecture Hours.**
History and cultures of the peoples of the African Diaspora from the fourteenth through the nineteenth centuries; social, political, and economic impact on Africa, the Americas, Europe, and the Arab World; emphasis on race, gender, identity, and migration.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
AFST 357/HIST 357.

### HIST 358/ASIA 358 Chinese Cultural History
**Credits**: 3.3 **Lecture Hours.**
Examination of Chinese culture and its evolution over the last 4,000 years; customs, art, literature, festivals, folklore, religion, architecture, medicine, and everyday life.
**Prerequisite**: Junior or senior classification.

### Cross Listing:
ASIA 358/HIST 358.

### HIST 359 American Environmental History
**Credits**: 3.3 **Lecture Hours.**
History of American attitudes toward nature: use of land, water, timber, oil, coal, wildlife and other natural resources in the United States; conservation movement and significant conflicts over resources; changing perception of the physical environment.

### HIST 360 History of Energy in America
**Credits**: 3.3 **Lecture Hours.**
Impact of energy upon industrial America; emphasis on relationship between energy and industrial development, emergence of state and federal energy policies, role of energy in foreign policy, growth of energy-oriented industries and impact of energy development on the environment.

### HIST 361 Technology and Engineering in Western Civilization, 1400-Present
**Credits**: 3.3 **Lecture Hours.**
Man’s material culture and his understanding of the physical world since the 15th century; role of the Renaissance and the Scientific, Agricultural and Industrial Revolutions in Europe; the resulting transformations in western civilization.

### HIST 362 History of Science
**Credits**: 3.3 **Lecture Hours.**
The ideas of the great scientists and their impact on society; the Newtonian Revolution; Lavoisier and the new chemistry; Darwin and evolutionary thought; Enrico Fermi, Robert Oppenheimer and the development of nuclear energy.

### HIST 363 History of Science in America
**Credits**: 3.3 **Lecture Hours.**
The major developments in the physical and life sciences from colonial times to the present; the lives and scientific contributions of such famous American scientists as Benjamin Franklin, Joseph Henry, Thomas Edison and J. Robert Oppenheimer.
HIST 364 History of Technology and Engineering in America, 1607-Present
Credits 3. 3 Lecture Hours.
American technological development from the colonial times to the present; technology in society, factors affecting technological development, changing attitudes toward technological accomplishments and the effects of technology upon society.

HIST 365/RELS 365 Religion in Early America
Credits 3. 3 Lecture Hours.
Religion in North America from colonial beginnings to eve of Civil War; relations between European Christianity, Native Americans and African Americans; religious pluralism, reform movements, social and political change.
Prerequisite: Junior or senior classification.
Cross Listing: RELS 365/HIST 365.

HIST 366/RELS 366 Religion in Modern America
Credits 3. 3 Lecture Hours.
Religion in America from the Civil War to contemporary period; relationship of religion and racial formation, capitalism, gender, sexuality, immigration; religious pluralism; evangelicalism; role of religious politics and social movements.
Prerequisite: Junior or senior classification.
Cross Listing: RELS 366/HIST 366.

HIST 367 Colonization of North America
Credits 3. 3 Lecture Hours.
Geographic setting; early English, French, Dutch, Swedish discovery, conquest and settlement, 1497-1763; colonial administration; colonial life; inter-colonial wars.

HIST 368 The Birth of the Republic, 1763-1820
Credits 3. 3 Lecture Hours.
Impact of French and Indian War; British colonial policy 1763-1775; War for Independence; Confederation crisis; Constitution-making and ratification; development of political parties; problem of foreign entanglements; War of 1812; conflict of nationalist and sectionalist tendencies; historiography and interpretation.

HIST 369 The United States, 1820-1860
Credits 3. 3 Lecture Hours.
Jacksonian democracy; impact of nationalism and sectionalism; manifest destiny and Mexican War; slavery controversy; expansion.

HIST 370 Civil War and Reconstruction
Credits 3. 3 Lecture Hours.
Survey of background and causes of the war; military, political, economic, and diplomatic aspects of the war; life behind the lines; Reconstruction and post-war adjustments, 1861-1877.

HIST 371 America in the Gilded Age, 1877-1901
Credits 3. 3 Lecture Hours.
The United States from 1877 to 1901; political, cultural and economic developments.

HIST 372 Reform, War and Normalcy: The United States, 1901-1929
Credits 3. 3 Lecture Hours.
Emergence of Progressivism; reform in the cities and states; reforms and foreign policies of the Theodore Roosevelt, William Howard Taft and Woodrow Wilson administrations; World War I and aftermath; Harding-Coolidge normalcy; the Jazz Age; Hoover and the Great Crash.

HIST 373 The Great Depression and World War II
Credits 3. 3 Lecture Hours.
The United States, 1929-1945; cultural, social, economic, and political developments in the nation; global diplomacy and military strategy.

HIST 374 The United States After World War II
Credits 3. 3 Lecture Hours.
The United States since World War II; political, economic, cultural and social changes and role as a world leader.

HIST 375 Great Scientists in History
Credits 3. 3 Lecture Hours.
History of fundamental scientific principles through biography; Galileo, Newton, Darwin, Mendel, Curie, Einstein, Pauling, and others.
Prerequisite: Junior or senior classification.

HIST 401 Slavery in World History
Credits 3. 3 Lecture Hours.
Comparative history of human slavery; slavery in the Ancient World, Asia, Africa; varieties of modern slavery in the New World since 1500; abolition of slavery and continuing forms of human bondage in the contemporary world.
Prerequisite: Junior or senior classification.
Cross Listing: AFST 401 and ASIA 401.

HIST 402 Germany Since 1815
Credits 3. 3 Lecture Hours.
A survey of the unification of Germany; creation of the German Empire; Weimar Republic; rise and fall of Nazi Germany; and the role of Germany in international diplomacy.

HIST 403 History of Nazi Germany
Credits 3. 3 Lecture Hours.
Inner workings of the Third Reich from inception in 1933 to collapse at the end of World II in 1945; leadership and structure of the Nazi party; family life, religion and business.

HIST 404 Post 1945 Germans
Credits 3. 3 Lecture Hours.
Examines Germany from the end of World War II to the end of the 20th century; includes political, social, cultural, and economic life in divided and occupied Germany; covers Germany since reunification in 1990.
Prerequisite: Junior or senior classification.

HIST 405 History of the Holocaust
Credits 3. 3 Lecture Hours.
History of the Nazi Holocaust; Third Reich; Jewish Ghetto life and concentration camps; role of the military, S.S. and German business; lessons and legacies.

HIST 406 The Era of the French Revolution and Napoleon, 1715-1815
Credits 3. 3 Lecture Hours.
Origins and events of the French Revolution; Napoleon Bonaparte and the First Empire; social, economic, political and military developments in France and Europe.

HIST 407 History of France Since 1815
Credits 3. 3 Lecture Hours.
Nineteenth century Bourbon, Orleanist, Bonapartist and Republican regimes; France in World Wars I and II; De Gaulle and the role of France in the 20th century.

HIST 410 Russian History to 1801
Credits 3. 3 Lecture Hours.
Origins and Christianization of Russia; establishment and decline of Kievan Rus’ state; Mongol conquest and domination of Russia; rise of Moscow, establishment of tsardom, expansion of state in sixteenth and seventeenth centuries; Peter the Great’s reforms; emergence of Russian Empire as a major power; era of Catherine the Great.
HIST 411 Imperial Russia 1801-1917
Credits 3. 3 Lecture Hours.
The last century of the autocratic Romanov dynasty and the social, intellectual, economic and political forces that ended it; political culture, society in transition, international affairs and revolutionary groups in an era of reform, counter-reform, reaction and industrialization.

HIST 412 Soviet Union 1917-1991
Credits 3. 3 Lecture Hours.
Political and social evaluation of the Soviet system; the Russian Revolution and consolidation of Bolshevik power; Civil War; power struggles among Lenin's successors; Stalin's industrial revolution, collectivization, and terror; Khrushchev's de-Stalinization campaign, stagnation under Brezhnev; Gorbachev's attempts at radical reform; the collapse of the Soviet Union.

HIST 416 Texas as Border Region
Credits 3. 3 Lecture Hours.
History of Texas since annexation; slavery and its aftermath; border cultures and identities; race and ethnicity; modernization and its discontents.
Prerequisite: Junior or senior classification or approval of instructor.

HIST 418 European Intellectual History from Ancient Greece to the Early Middle Ages
Credits 3. 3 Lecture Hours.
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from Pre-Socratic Greece through the formative stages of the Christian Middle Ages.
Prerequisite: Junior or senior classification.
Cross Listing: CLAS 418 and RELS 418.

HIST 419/RELS 419 European Intellectual History from the High Middle Ages to the 17th Century
Credits 3. 3 Lecture Hours.
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from the founding of Scholasticism and the University System to the New Philosophy and science of 17th century.
Prerequisite: Junior or senior classification.
Cross Listing: RELS 419/HIST 419.

HIST 420 European Intellectual History from the Enlightenment to 1900
Credits 3. 3 Lecture Hours.
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy in the 18th and 19th centuries.

HIST 421 European Intellectual History in the Twentieth Century
Credits 3. 3 Lecture Hours.
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from the turn of the century to the present.

HIST 425/CLAS 425 The Ancient Greeks
Credits 3. 3 Lecture Hours.
Greek History and civilization from the Archaic Age to Alexander the Great (8th-4th century B.C.).
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: CLAS 425/HIST 425.

HIST 426/CLAS 426 The Ancient Greeks
Credits 3. 3 Lecture Hours.
Roman history and civilization from the beginnings of the Republic (6th/5th century B.C.) to the late 2nd century B.C.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: CLAS 426/HIST 426.

HIST 427/CLAS 427 The Roman Republic I: The Empire Builders
Credits 3. 3 Lecture Hours.
Roman history and civilization from the late 2nd century B.C. to the 1st century A.D.
Prerequisite: Junior or senior classification, or approval of instructor.

HIST 428/CLAS 428 The Roman Republic II: The Civil Wars
Credits 3. 3 Lecture Hours.
Roman history and civilization from the late 2nd century B.C. to the 1st century A.D.
Prerequisite: Junior or senior classification, or approval of instructor.

HIST 429/CLAS 429 The Roman Empire
Credits 3. 3 Lecture Hours.
Roman History and civilization of the Imperial Period (1st century B.C.-6th century A.D.).
Prerequisite: Junior or senior classification, or approval of instructor.

HIST 430 The Nation of Ireland, 1800 to the Present
Credits 3. 3 Lecture Hours.
History of Ireland from the creation of the United Kingdom through the end of the twentieth century; British-Irish relations; agrarian unrest and violence; famine; political, cultural, and religious developments.
Prerequisite: Junior or senior classification.

HIST 431 The Kingdom of Ireland, 1541-1800
Credits 3. 3 Lecture Hours.
History of Ireland from the mid sixteenth century through the end of the eighteenth century; impact of religion, politics, warfare, land disputes, famine, and international developments; creation of the United Kingdom.
Prerequisite: Junior or senior classification.

HIST 432 The Nation of Ireland, 1800 to the Present
Credits 3. 3 Lecture Hours.
History of Ireland from the creation of the United Kingdom through the end of the twentieth century; British-Irish relations; agrarian unrest and violence; famine; political, cultural, and religious developments.
Prerequisite: Junior or senior classification.

HIST 433 Sixteenth-Century Britain
Credits 3. 3 Lecture Hours.
Changes in social, cultural, economic, political and religious institutions and organization; growth of the nation state; the "new monarchy"; Reformation and religious settlement; international relations; inflation and social dislocation; the role of Parliament.

HIST 436 Seventeenth-Century Britain
Credits 3. 3 Lecture Hours.
Social, political, economic, cultural and religious developments, Puritanism and the Revolution of the 1640s, the Restoration, establishment of constitutional monarchy after 1688, Great Britain’s rise as an imperial power.

HIST 437 Eighteenth Century Britain
Credits 3. 3 Lecture Hours.
Political, social, economical, intellectual, cultural, and imperial history of Britain in the eighteenth century.
Prerequisite: Junior or senior classification.

HIST 438 Nineteenth Century Britain
Credits 3. 3 Lecture Hours.
Political, social, economic, cultural, intellectual and military history of Great Britain from 1815 to 1914.
Prerequisite: Junior or senior classification or approval of instructor.

HIST 439 Twentieth Century Britain
Credits 3. 3 Lecture Hours.
Constitutional, political, economic, military, social and cultural history of Great Britain since 1900.
Prerequisite: Junior or senior classification or approval of instructor.
HIST 440 Latin American Cultural and Intellectual History
Credits 3. 3 Lecture Hours.
Main currents of culture and thought as shaped by historical circumstances.

HIST 441 History of Mexico, 1821 to the Present
Credits 3. 3 Lecture Hours.
Political, economic and social development of Mexico since independence and her relation to other world powers.

HIST 442 World War II
Credits 3. 3 Lecture Hours.
Origins; military campaigns in Europe, North Africa, Asia, and the Pacific; European, Japanese, Asian, and American home fronts; collapse of Germany; atomic warfare; legacies.
Prerequisite: Junior or senior classification.

HIST 443 American Military History to 1901
Credits 3. 3 Lecture Hours.
American military experience from colonial days to 1901; causes, nature and effect of the wars in which the United States has participated.

HIST 444 American Military History Since 1901
Credits 3. 3 Lecture Hours.
American military experience from 1901 to present; causes, nature and effect of wars in which the United States has participated; effect of war on American history.

HIST 445 History of Modern Military Thought
Credits 3. 3 Lecture Hours.
Military thought and theory, 1700 to the present.

HIST 447 Law and Society in the United States
Credits 3. 3 Lecture Hours.
How political and social conditions in American history have produced fundamental constitutional principles, changes and practices; historical evolution of written and unwritten Constitution.

HIST 449 History of Brazil, 1822 to the Present
Credits 3. 3 Lecture Hours.
Political, cultural and economic development of Brazil since independence; slavery and race relations; relation to other world powers.
Prerequisite: Junior classification.

HIST 450 Southern Identities and Cultures through Reconstruction
Credits 3. 3 Lecture Hours.
Focus on parts of North America where slavery dominated the economy, politics and demographics; experiences of native, African and European-descended peoples in such regions from the colonial period to the end of slavery; debates about geographical and cultural roots of regional identities.
Prerequisite: Junior or senior classification or approval of instructor.

HIST 451 Southern Identities and Cultures Since Reconstruction
Credits 3. 3 Lecture Hours.
Focus on the aftermath of slavery and defeat in those parts of North America where slavery dominated the economy, politics and demographics; transformations in race, culture and politics in such regions and emergence of new identities since Reconstruction; debates over the geographic and cultural roots of the American South.
Prerequisite: Junior or senior classification or approval of instructor.

HIST 452 The American Revolution
Credits 3. 3 Lecture Hours.
The causes and consequences of revolutionary activity; battlefields and homefronts during the War for Independence; social, political and economic impact of the Revolution on diverse peoples and communities both in the new United States and abroad; historical memory of the American Revolution.
Prerequisite: Junior or senior classification.

HIST 453 The American Frontier
Credits 3. 3 Lecture Hours.
Westward movement; patterns of westward expansion, pioneer settlement, the West in diplomacy and influence of frontier on American life and institutions.

HIST 455 History of the American City
Credits 3. 3 Lecture Hours.
History of American Cities; a social, economic and political study of industry, labor and immigration; development of a metropolitan society.

HIST 456 American Agricultural History
Credits 3. 3 Lecture Hours.
History of American agricultural development from the Revolutionary period to the present; technological developments, major farm industries, labor, regional development, farm movements and farm programs.

HIST 459 American Society and Culture to 1877
Credits 3. 3 Lecture Hours.
Century of social and political thought, religion, science, scholarship and education in the United States.

HIST 460 American Society and Culture Since 1877
Credits 3. 3 Lecture Hours.
Continuation of HIST 459 from 1877 to the present.

HIST 461/WGST 461 History of American Women
Credits 3. 3 Lecture Hours.
Cultural, political, legal and religious factors that helped shape the role and character of women in American society from colonial times to the present; historical role of women in the development of the nation.
Cross Listing: WGST 461/HIST 461.

HIST 462 American Foreign Relations to 1913
Credits 3. 3 Lecture Hours.
History of U.S. foreign relations and policies to 1913.
Prerequisite: Junior or senior classification or approval of instructor.

HIST 463 American Foreign Relations Since 1913
Credits 3. 3 Lecture Hours.
History of U.S. foreign relations and policies since 1913.
Prerequisite: Junior or senior classification or approval of instructor.

HIST 464 International Developments Since 1918
Credits 3. 3 Lecture Hours.
General survey of world politics since close of World War I; problems and ideologies of great powers of Europe and factors and conditions which explain present political tendencies and policies.

HIST 469 History of Collective Protest and Violence
Credits 3. 3 Lecture Hours.
Examination of collective protest and violence on a case study basis and in comparative and historical context; emphasis on causes, the nature of participation, assumptions and goals, and the character of repression.
Prerequisite: Junior or senior classification.
HIST 470 American Business History
Credits 3. 3 Lecture Hours.
Management strategy and structure of the modern corporation in 19th and 20th century America and the corporation's changing roles in American society.

HIST 473/WGST 473 History of Modern American Women
Credits 3. 3 Lecture Hours.
Emergence of modern American women in the 1890s; examination of their history from the 1890s to the present; women as organizers, innovators, political reformers, workers, social activists, housewives, mothers, consumers and feminists.
Cross Listing: WGST 473/HIST 473.

HIST 475 Empire and History
Credits 3. 3 Lecture Hours.
Survey of empire in a wide historical and comparative framework using a case study approach; themes of a given case study include changing social, economic, and cultural politics of imperialism, resistance in colonial environments, colonial and post-colonial identities, and race and gender relations. May be taken 3 times for credit.
Prerequisite: Junior or senior classification.

HIST 476/WGST 476 Sex and Sexuality in History
Credits 3. 3 Lecture Hours.
Changing ideas about sex and sexuality over time; includes their interaction with ideas about gender, race, class, religion, science, technology, medicine, politics and popular culture; historical and cultural processes creating modern concerns about sex and sexuality.
Prerequisite: Junior or senior classification.
Cross Listing: WGST 476/HIST 476.

HIST 477/WGST 477 Women and Gender in Modern European History
Credits 3. 3 Lecture Hours.
Women in Europe from the 18th century to the present: women's contributions to their societies; realities of their daily lives and their responses; perceptions of women; role of institutions in defining women's roles; significance of women of industrialization, revolution, warfare, scientific discoveries; interaction of class, race and gender.
Cross Listing: WGST 477/HIST 477.

HIST 481 Seminar in History
Credits 3. 3 Lecture Hours.
Literature of an issue, event, period or people in history; use of primary source materials connected with the field of the seminar; problems of bibliography, historiography and historical method; and experience in writing.
Prerequisite: 21 credits of history, 9 of which must be 300-level or above. Open to senior history majors or with instructor's approval.

HIST 482 Health Humanities Senior Seminar
Credits 3. 3 Lecture Hours.
Capstone course; application of skills and knowledge acquired during health humanities concentration coursework; exposure to specialized methods of inquiry; development and execution of an individualized final project.
Prerequisites: HHUM 107; junior or senior classification.
Cross Listing: COMM 482, ENGL 482, and HHUM 482.

HIST 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Selected fields of history not covered in depth by other courses. Reports and extensive reading required.
Prerequisite: Approval of department head.

HIST 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of history.

HIST 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in history.
Prerequisites: 24 hours if history, with 12 or more at 300-level or above; junior or senior classification and approval of instructor.

HIST 497 Independent Honors Studies
Credits 1 to 3. 1 to 3 Other Hours.
Directed independent studies for upper division Honors students, regardless of academic major, in selected aspects of history.
Prerequisites: Junior or senior classification either as Honors student or with overall GPR of 3.25 and letter of approval from head of student's major department and approval of head, Department of History.

HLTH - Health (HLTH)

HLTH 210 Introduction to the Discipline
Credits 3. 3 Lecture Hours.
Concepts essential to understanding the discipline: competencies and career opportunities for professional health educators in school and community settings.
Prerequisites: Current health major; HLTH 231 or concurrent enrollment.

HLTH 214/KINE 214 Health and Physical Activity for Children
Credits 3. 3 Lecture Hours.
(PHED 1331) Health and Physical Activity for Children. Coordinated school health and physical activity programs appropriate for elementary aged children; focus on the content of the curriculum and the philosophical underpinnings of programming related to health and physical activity.
Prerequisite: KINE 198.
Cross Listing: KINE 214/HLTH 214.

HLTH 216 First Aid
Credits 2. 1 Lecture Hour. 2 Lab Hours.
(PHED 1306) First Aid. Basic first aid instruction leading to National Safety Council, University Level, first aid course completion recognition.

HLTH 221 Safety
Credits 3. 3 Lecture Hours.
The magnitude of the accident problem as it relates to individual and community well-being; promotion of safe behavior. No credit will be given for both HLTH 221 and SAED 301.

HLTH 222 Concepts in Peer Health Education
Credits 3. 3 Lecture Hours.
Preparation as peer educators and campus community leaders; experiential learning; includes various health topics, program development, presentation and public speaking, communication and group facilitation.

HLTH 231 Healthy Lifestyles
Credits 3. 3 Lecture Hours.
(PHED 1304) Healthy Lifestyles. Health issues relevant to students; included are mental health, use and abuse of drugs, human sexuality, communicable diseases, environmental and consumer health.
HLTH 236 Race, Ethnicity and Health
Credits 3. 3 Lecture Hours.
Explore in-depth the racial, ethnic, and cultural dimensions that underlie health and health disparities; emphasis on culture, social economic status and governmental policies as they influence the adaptation of health practices.

HLTH 240/KINE 240 Computer Technology in Health and Kinesiology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of current technology in the areas of health and kinesiology; fundamentals of computers and their use; application of commercial software to health and kinesiology settings; use of computer networks for communications and research.
Prerequisite: Freshman or sophomore classification in health or kinesiology.
Cross Listing: KINE 240/HLTH 240.

HLTH 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Work on a specified topic with the intent of promoting independent reading, research and study; supplement existing course offerings or subjects not presently covered.
Prerequisites: Freshman or sophomore classification; approval of instructor.

HLTH 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in health. May be repeated 4 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

HLTH 331 Community Health
Credits 3. 3 Lecture Hours.
Aspects of the community that relate to health; identification and analysis of community health programs; organizational pattern and functions of voluntary and governmental health agencies; organizing the community for health action; and coordination of school and community health programs.
Prerequisite: HLTH 231 or concurrent enrollment.

HLTH 332 School Health Program
Credits 3. 3 Lecture Hours.
Background, development, administration and framework of the school health program; role of the school health team; nature and function of school health services and healthful school living.
Prerequisite: HLTH 231 or concurrent enrollment.

HLTH 333 Spirituality and Health
Credits 3. 3 Lecture Hours.
Exploration of the relationship between spirituality, religion, health, health education and spiritual health; identification of techniques to measure spiritual health/wellness and enlighten healthcare professionals to the role spiritual health plays in healing; identification of spirituality topics important to health care professionals.
Prerequisite: HLTH 231, HLTH 331 or approval of instructor.

HLTH 334/WGST 334 Women's Health
Credits 3. 3 Lecture Hours.
A broad range of health issues that are either unique to women or of special importance to women; information for the health consumer; preparation as an advocate of healthy lifestyles; awareness of the role health plays in the life of all women.
Prerequisite: Junior or senior classification.
Cross Listing: WGST 334/HLTH 334.

HLTH 335 Human Diseases
Credits 3. 3 Lecture Hours.
Causes of disease, course of communicable disease, body’s defense against disease and classification and description of diseases.
Prerequisite: BIOL 319, BIOL 320; admission to professional phase of program.

HLTH 342 Human Sexuality
Credits 3. 3 Lecture Hours.
Many aspects of human sexuality; physiology and function of human reproductive system; factors involved in learning sex roles; biological and emotional motivations associated with the sexual aspects of life and their relationship to marriage and family planning.
Prerequisite: Admission to the professional phase of program.

HLTH 353 Drugs and Society
Credits 3. 3 Lecture Hours.
Use and abuse of drugs in today’s society; physiological, sociological and psychological factors involved.
Prerequisite: BIOL 319, BIOL 320; admission to professional phase of program.

HLTH 354 Medical Terminology for the Health Professions
Credits 3. 3 Lecture Hours.
Designed for students interested in pursuing a career in a health, medical, scientific or other helping profession; develop medical word power skills combined with related health and disease knowledge.
Prerequisite: Junior or senior classification.

HLTH 403 Consumer Health
Credits 3. 3 Lecture Hours.
#Selection, evaluation and understanding of health information, medical services, advertising of products and sociocultural factors in consumer health protection.
Prerequisite: Junior or senior classification.

HLTH 405 Rural Health
Credits 3. 3 Lecture Hours.
Issues facing rural health care; emphasis on understanding the geographical characteristics of rural communities and their affect on health care delivery.
Prerequisites: HLTH 331; junior or senior classification.

HLTH 407 Global Health
Credits 3. 3 Lecture Hours.
Overview of global health issues; synthesis of historical, cultural, environmental, economic and political perspectives; gathering and understanding international health statistics; cultural, social and political impacts on health and health care behaviors; clinical and population-based approaches to health management and illness resolution; ethical issues implicit in conducting health research; private and public agency relief strategies; opportunities for employment in international health.
Prerequisites: Admission to the professional phase of program; junior or senior classification or approval of instructor.

HLTH 410 Exercise and Health Programs in the Workplace
Credits 3. 3 Lecture Hours.
Careful examination of strategies to design, implement and evaluate exercise and health programs in worksites; including health risk assessment, marketing protocol, needs assessment, corporate culture issues, policy development and cost-benefit analysis.
Prerequisite: Junior or senior classification.
HLTH 415 Health Education Methodology
Credits 3. 3 Lecture Hours.
Theory and practice in the development and use of creative and traditional health education strategies in secondary schools and community settings; emphasis is given to cognitive, affective and behavioral teaching strategies.
Prerequisites: Senior classification and approved acceptance to field experience.

HLTH 421 Elementary School Health Instruction
Credits 3. 3 Lecture Hours.
Modern issues, trends, content and material in elementary school health programs; research and instructional strategies essential for reading in content areas with an emphasis on developing the coordinated school health education for health and kinesiology teacher certification majors.
Prerequisite: Junior or senior classification in health and kinesiology; admission to professional phase of program.

HLTH 425 Health Program Evaluation
Credits 3. 3 Lecture Hours.
Theory and practice in evaluation of health programs in school and community; analysis of test results; evaluation of standardized health tests.
Prerequisites: Senior classification and approved acceptance to field experience.

HLTH 429 Environmental Health
Credits 3. 3 Lecture Hours.
Health aspects of environments; health problems related to water, air and noise pollution; pesticides; population and radiation; examination of various micro-environments which either promote or hinder human health and well-being and their implications for community planning and utilization of human resources.
Prerequisite: Junior or senior classification.

HLTH 440 Contemporary Issues for Community Health Interns
Credits 3. 3 Lecture Hours.
Preparatory course for advanced students in the community health internship program.
Prerequisite: Acceptance to internship program.

HLTH 445 Professional Practice in Health Education
Credits 2. 2 Lecture Hours.
Information, perspectives and skills to promote health and quality of life effectively in community, school, workplace and health-care settings; boundary-crossing partnerships across health disciplines; the role of collaborative efforts to better meet community health needs.
Prerequisites: Admission to professional phase of program; junior or senior classification.

HLTH 481 Seminar in Allied Health
Credit 1. 1 Lecture Hour. 1 Lab Hour.
Admission to allied health professional school and/or careers; research on selected allied health fields, discussion of transition from college environment to professional school/career environment including professional development. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification.

HLTH 482 Grant Writing in Health
Credit 1. 1 Lecture Hour.
A writing intensive course focused on grant writing in the field of health education and health promotion; grant application written by student on a health-related topic using a recursive writing process. May be taken two times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Admission to professional phase of program.

HLTH 484 Community Health Internship
Credits 0 to 12. 0 to 12 Other Hours.
Supervised internship at selected community, public or private health agencies.
Prerequisites: HLTH 415, HLTH 425 and HLTH 440; completion of all coursework.

HLTH 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study of special problems within the discipline.
Prerequisites: Junior or senior classification; approval of instructor.

HLTH 489 Special Topics in...
Credits 0 to 4. 0 to 4 Lecture Hours.
Selected topics in an identified area of the discipline. May be repeated for credit.

HLTH 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in health. May be repeated 4 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

HORT - Horticultural Sciences (HORT)

HORT 101 Concepts of Horticultural Science
Credit 1. 1 Lecture Hour.
Introduction to the many facets of horticulture in Texas and the United States including organization, history and nature of the industry; discussion of professional development and identification of career opportunities.

HORT 201 Horticultural Science and Practices
Credits 3. 3 Lecture Hours.
(AGRI 1315, AGRI 1415, HORT 1301, HORT 1401) Horticultural Science and Practices. Structure, growth and development of horticultural plants from a practical and scientific approach; environmental effects, basic principles of propagation, greenhouse and outdoor production, nutrition, pruning and chemical control of growth, pest control and branches of horticulture.

HORT 202 Horticultural Science and Practices Laboratory
Credit 1. 3 Lab Hours.
(HORT 1101, AGRI 1115, HORT 1401, AGRI 1415) Horticultural Science and Practices Laboratory. Methods and practices related to production of horticultural crops; practical exercises in greenhouse and field.
Prerequisite: HORT 201 or registration therein.

HORT 203 Floral Design
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Principles of design illustrated with the use of floral materials; floral design elements and techniques including color, form, line and texture; history and utilization of floral art in society.

HORT 225 Horticulture Learning Community
Credit 1. 1 Lecture Hour.
Understanding the personal and professional competencies that should develop during college career; determine learning style; develop oral and written communication skills, teamwork and leadership characteristics, analytical and critical thinking, research and problem solving skills; exposure to current critical issues in horticulture and science.
Prerequisite: Horticulture or floriculture major.
HORT 281 Horticulture as a Profession
Credit 1. 1 Lecture Hour.
Comprehensive view of the opportunities in the art and science of horticulture; sub-disciplines by crop (fruit, vegetable, ornamental, floral) and approach (landscaping, production, sales, management, floral design, research); examination of the national and international scope of horticulture including the major horticultural regions in Texas; construction of a professional e-portfolio.

HORT 291 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in horticulture. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

HORT 301 Garden Science
Credits 3. 3 Lecture Hours.
Identification, propagation, soil management, fertilization, growth control and protection of common garden plants: indoor ornamentals, landscape ornamentals, fruits and vegetables; special topics include home landscaping, container gardens, bonsai, herbs and medicinal plants and hobby greenhouse management. The effects of organic and non-organic practices on the garden ecosystem.

HORT 302 Garden Science Lab
Credit 1. 3 Lab Hours.
Practical activities in identification, propagation, fertilization, media preparation, soil management, irrigation and protection of indoor ornamentals, landscape ornamentals, fruits and vegetables common in gardens in Texas. Organic and non-organic methods.

HORT 306 Trees and Shrubs for Sustainable Built Environments
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Better known woody ornamental trees and shrubs; identification, morphology, classification, nomenclature and adaptability for use in landscape environments.
Prerequisite: BIOL 111 or BIOL 113 or HORT 201 or approval of instructor.

HORT 308 Plants for Sustainable Landscapes
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Identification and use of indigenous and introduced landscape plants; plants for special uses in urban environments; emphasis on plants' ornamental attributes, cultural requirements, and adaptability in urban and suburban environments.
Prerequisite: BIOL 111 or BIOL 113 or HORT 201 or HORT 306 or approval of instructor.

HORT 309 Interior Plants
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Identification, selection and maintenance of interior foliage plants; emphasis on design solutions for commercial and private facilities.
Prerequisites: HORT 201; junior or senior classification.

HORT 311/FSTC 311 Principles of Food Processing
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited.
Prerequisites: FSTC 201; junior or senior classification or approval of department head or instructor.
Cross Listing: FSTC 311/HORT 311.

HORT 315 Issues in Horticulture
Credits 3. 3 Lecture Hours.
Analysis of contemporary economic, technological, environmental, human resource, and regulatory issues that impact the way global horticultural firms compete; emphasis on problem recognition and analysis of managerial decisions by firms throughout the entire horticultural supply chain.
Prerequisites: HORT 201 and HORT 202.

HORT 319 Fruit and Nut Production
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Rootstocks, cultivars, identification, site selection, pollination, pruning, fruit thinning, dormancy, orchard culture management, pest control, harvesting and post harvest physiology of temperate fruit and nut species.
Prerequisite: HORT 201.

HORT 325 Vegetable Crop Production
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Origin, nutritive value, economic importance, botany and cultural practices of the major vegetable crops. Lab activities include organic and non-organic production of major vegetable crops.

HORT 326 Plant Propagation
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles, practices and techniques followed in the sexual and asexual propagation of horticultural plants: seed technology and seed propagation, rooting and propagation of cuttings, graftage and budding systems, layering and propagation by specialized plant structures, biotechnology and tissue culture systems for micropropagation.

HORT 332 Horticulture Landscape Graphics
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Graphic representation of landscape design; demonstrations of technique; examination of drawing examples and drawing production; basic hand graphics techniques for visual-thinking and presentation-quality landscape drawings.
Prerequisite: Junior or senior classification.

HORT 335 Sociohorticulture
Credits 3. 3 Lecture Hours.
Horticulture as it relates to humans through people-plant interactions; use of horticulture to improve quality of life; awareness and appreciation of the economic, environmental, social and health benefits of plants.
Prerequisite: Junior classification.

HORT 400 Field Studies in Horticulture
Credits 1 to 3. 1 to 9 Other Hours.
Field trip to observe operation of horticultural businesses, governmental agencies affecting horticultural programs, and public and private institutions active in horticulture in the U.S. and other countries; usually arranged during spring break, between semesters or during the summer; may be repeated for credit.
Prerequisites: HORT 201 or HORT 301 and approval of instructor.

HORT 404/GENE 404 Plant Breeding
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of genetics and other sciences to breeding and improvement of horticultural crops; methods and special techniques employed. Offered in even numbered years.
Prerequisite: GENE 301.
Cross Listing: GENE 404. Credit cannot be given for both HORT 404/GENE 404 and SCSC 304.
HORT 416 Understanding Wine: From Vines to Wines and Beyond
Credits 3. 3 Lecture Hours.
Facets of wine in the United States and around the world; the history of wine, grape growing and winemaking, types of wine, wine etiquette, beer and spirits, sensory evaluation, wine marketing, and winery tasting room and event management.
Prerequisites: Must be 21 years of age; junior senior classification.

HORT 418 Nut Culture
Credits 3. 3 Lecture Hours.
Orchard management, native grove development, cultivars, fruit setting, soils, nutrition, propagation, pest control, harvesting, shelling, storage and marketing of temperate tree nut crops grown in the U.S. with major emphasis on pecans. Offered in even numbered years.
Prerequisite: HORT 319 or approval of instructor.

HORT 419 Viticulture and Small Fruit Culture
Credits 3. 3 Lecture Hours.
Classic wine grape culture in Europe and U.S. are taught; influence of climate, soil, cultivar, rootstock, canopy and management is presented; nutrition, water, spacing, trellis, pruning, IPM and harvest are integrated for quality yields; culture of muscadines, berries, figs and persimmons are taught. Offered in even numbered years.
Prerequisite: HORT 319 or approval of instructor.

HORT 420 Concepts of Wine Production
Credits 3. 3 Lecture Hours.
Classic wine grapes of the world and where they are produced; evaluation of wine style and quality through formal laboratory tastings.
Prerequisites: HORT 201, HORT 319, HORT 419 or HORT 446/FSTC 446 or FSTC 201; must be 21 years of age; junior or senior classification.

HORT 421 Enology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Provides a basic understanding of each step of the wine making process; emphasis on home and small scale commercial wine production as related to Texas conditions.
Prerequisites: Must be 21 years of age; junior or senior classification.

HORT 423 Tropical Horticulture
Credits 3. 3 Lecture Hours.
Production, processing and marketing of coffee, bananas, cacao, mango, cashew, pineapple, coconut and root and tuber crops; recent significant developments in plant breeding and cultural practices. Offered in odd numbered years.
Prerequisites: HORT 201 or approval of instructor.

HORT 425 Landscape Maintenance and Construction
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles and practices of grading, drainage and construction of residential and small commercial landscapes; cost and bid estimation; soil preparation; transplanting operations; control of landscape diseases and pests; maintenance of landscape areas.
Prerequisite: HORT 201 or approval of instructor.

HORT 426 International Floriculture Marketing
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Importance, cost, and opportunities in marketing floral products, fresh cut flowers, flowering potted plants, foliage plants, and bedding/garden plants; topics include: world production areas, economic value, species grown, marketing channels, retail environments, current/future consumers, postharvest handling, promotion/advertising, perceived/added value, marketing trends and employment opportunities.
Prerequisites: HORT 201; junior or senior classification.

HORT 427 Fall Greenhouse Crops
Credit 1. 2 Lab Hours.
Hands-on lab for growing and managing fall greenhouse crops including fall bedding plants, cut flowers, foliage, poinsettias and other flowering potted plants.

HORT 428 Greenhouse Operation and Management
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Principles of greenhouse operation and management for production of horticultural crops; construction and operation of greenhouse structures and systems; regulating and controlling the environment and applying cultural practices as they affect plant physiological processes and influence plant growth and development; management of a greenhouse business.
Prerequisite: HORT 201.

HORT 429 Floriculture Crop Production
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Production of floriculture crops in the greenhouse environment; scheduling and controlling crop growth for target market periods; specific flowering crops will be used as models to demonstrate potted flowering plant, cut flower, and garden plant production systems; hands-on crop production experience in lab.
Prerequisite: HORT 201.

HORT 431 Nursery Production and Management
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Container, field and protected culture production of ornamental nursery plants [shrubs, trees, ground covers, bedding plants and herbaceous perennials]; retail and wholesale nursery-site selection and development, financing, niche-marketing, personnel and labor management; wholesale nursery production cycles and systems, storage and shipping.

HORT 432 Horticulture Landscape Design
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of the principles and elements of design to planning and developing both exterior residential landscape designs and interior commercial designs.
Prerequisites: HORT 203; HORT 332 or concurrent enrollment; HORT 306 or concurrent enrollment, or HORT 308 or approval of instructor.

HORT 435 Urban Horticulture
Credits 3. 3 Lecture Hours.
Introduction to urban horticulture and its role in community development and well-being; emphasis on career opportunities and the roles of the urban horticulture professional. Offered in odd numbered years.
Prerequisite: Junior or senior classification.

HORT 440 International Horticulture
Credits 3. 3 Lecture Hours.
Examines the source of horticultural commodities; shows how geography, culture, politics, and history influence our markets, gardens and refrigerators; educates students on interpreting different garden styles; offered in even number years.
Prerequisite: Junior or senior classification.

HORT 442 Horticulture Landscape Design II
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduce computer-aided-drafting (CAD) to produce site layout, grading and planting plan, and construction details for small-scale landscape design; advanced design principles and practices in their historical context, includes design and drafting of hardscape details, manipulation of earth forms, ecological urban park design to traditional garden design.
Prerequisites: HORT 203, HORT 308 and HORT 432 or approval of instructor; junior or senior classification.
HORT 446/FSTC 446 Commercial Fruit and Vegetable Processing
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages; new product development emphasized via individual laboratory projects. Offered in even numbered years.
Prerequisite: FSTC 311/HORT 311.
Cross Listing: FSTC 446/HORT 446.

HORT 451 Retail Floristry
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles of floral design in a commercial shop enterprise; aspects of design in vase arrangements, personal flowers, sympathy flowers and flowers for special occasions; production costs and profit analysis, selling techniques and customer relations; term project required.
Prerequisite: HORT 203 or approval of instructor.

HORT 452 Floral Design: Weddings and Personal Flowers
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Basic principles of floral design as applied to wedding work; design principles and mechanics as applied to corsages, headpieces, hand bouquets and ceremony and reception decorations; history of wedding traditions; selling and pricing weddings.
Prerequisite: HORT 203 or HORT 451 or approval of instructor.

HORT 453 Floral Art
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Advanced study of floral design as an art form in contrast to a commercial florist operation; interpretive expression of design principles and color stressed along with international design styles.
Prerequisites: HORT 203; HORT 451 and/or HORT 452.

HORT 454 Special Event Design and Production
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Role of event planners, production managers, designers, and decorators within traditional event management practices; analyze how artistic components are used in visual styling to achieve a specific purpose; impact of collaborative planning, effective research, and strong communication skills, social psychological and economic influences as they relate to event planning.
Prerequisite: Junior or senior classification.

HORT 481 Seminar
Credits 2. 2 Lecture Hours.
Advanced preparation for the transition from college to the work environment including career investigation, presentation techniques and practice, resume and e-portfolio preparation, and professional development and career advancement; required of all senior students in horticulture.
Prerequisite: Junior or senior classification.

HORT 484 Internship
Credits 1 to 9. 1 to 9 Other Hours.
On-the-job experience program in the student's area of horticultural specialization. May be taken three times for credit.
Prerequisites: Sophomore, junior or senior classification; approval of instructor; 2.0 GPR in major and overall.

HORT 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems and projects in any area of horticulture.
Prerequisite: Junior or senior classification or approval of department head.

HORT 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of horticultural science. May be repeated for credit.
Prerequisite: Approval of instructor.

HORT 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in horticulture. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

HHUM - Health Humanities (HHUM)

HHUM 107 Introduction to the Health Humanities
Credits 3. 3 Lecture Hours.
Introduction to the methods and approaches of the health humanities; exposure to key scholarship in this field as well as major methods and approaches; application of such skills to the analysis of cultural case studies such as illness narratives or contemporary debates in scientific bioethics.
Cross Listing: COMM 107, ENGL 107, and HIST 107.

HHUM 482 Health Humanities Senior Seminar
Credits 3. 3 Lecture Hours.
Capstone course; application of skills and knowledge acquired during health humanities concentration coursework; exposure to specialized methods of inquiry; development and execution of an individualized final project.
Prerequisites: HHUM 107; junior or senior classification.
Cross Listing: COMM 482, ENGL 482, and HIST 482.

HUMA - Humanities (HUMA)

HUMA 211/RELS 211 Hebrew Scriptures
Credits 3. 3 Lecture Hours.
Philosophical concepts of the Hebrew Scriptures as they relate to the development of religious and ethical ideas.
Cross Listing: RELS 211/HUMA 211.

HUMA 213/RELS 213 New Testament
Credits 3. 3 Lecture Hours.
The origin and development of the religious and philosophical concepts of the New Testament.
Cross Listing: RELS 213/HUMA 213.

HUMA 303/RELS 303 Near Eastern Religions
Credits 3. 3 Lecture Hours.
Beliefs and practices of Judaism, Zoroastrianism, Christianity and Islam with particular attention to their philosophical presuppositions.
Cross Listing: RELS 303/HUMA 303.

HUMA 304/RELS 304 Indian and Oriental Religions
Credits 3. 3 Lecture Hours.
Beliefs and practices of Hinduism, Jainism, Sikhism, Buddhism, Confucianism, Taoism and Shinto with particular attention to their philosophical presuppositions.
Cross Listing: RELS 304/HUMA 304.
HUMA 321 Political Islam and Jihad
Credits 3. 3 Lecture Hours.
Interaction between Islamic movements and politics in various Middle Eastern countries; the meaning and evolution of jihad; the role of Islam as a tool for political and social mobilization.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: INTS 321 and RELS 321.

HUMA 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Directed Studies in humanities. May be repeated for credit.
Prerequisite: Approval of department head.

HUMA 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of humanities. May be repeated for credit.
Prerequisite: Approval of instructor.

IBUS - International Business (IBUS)

IBUS 285 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Directed study of selected problems in international business not covered in other courses. May be taken two times for credit.
Prerequisites: Freshman or sophomore classification in business.

IBUS 289 Special Topics in...
Credits 1 to 3. 1 to 3 Lecture Hours. 0 to 3 Lab Hours.
Selected topics in an identified area of international business. May be taken two times for credit.
Prerequisites: Freshman or sophomore classification in business.

IBUS 301 Business Study Abroad
Credits 1 to 18. 1 to 18 Lecture Hours.
For students in approved programs abroad. May be repeated for credit.
Prerequisites: Admission to upper division in Mays Business School and selected for program; approval of study abroad coordinator and academic dean.

IBUS 401/MKTG 401 Global Marketing
Credits 3. 3 Lecture Hours.
I Survey of the aspects involved in marketing products and services in the international market; tariffs, cultural restrictions, business environment and legal restrictions.
Prerequisite: MKTG 321.
Cross Listing: MKTG 401/IBUS 401.

IBUS 402/MKTG 402 International Marketing: Study Abroad
Credits 3. 3 Lecture Hours.
Introduces marketing students to the facets of designing and implementing a marketing strategy in an international setting; provides a traditional classroom experience along with personal exposure to a variety of European cultures; facilitates understanding of the international marketplace in which these students will function.
Prerequisites: Junior classification; MKTG 321 or MKTG 409.
Cross Listing: MKTG 402/IBUS 402.

IBUS 403/MKTG 403 International Market Entry Strategies
Credits 3. 3 Lecture Hours.
A research-based course in which students prepare an analysis of a country, or region outside the U.S., and use it in the preparation of a marketing plan for a good or service to be introduced and marketed in that country.
Prerequisites: MKTG 321; concurrent registration in IBUS 402/MKTG 402 or MKTG 102; junior or senior classification.
Cross Listing: MKTG 403/IBUS 403.

IBUS 430 Global Immersion in Accounting
Credits 3. 3 Lecture Hours.
Combination of classroom work in the spring and a field trip to the selected country in summer; introduction to international opportunities within the public accounting firms; meet with former students to gain a local and corporate view of business in the selected country.
Prerequisites: ACCT 327 and approval of instructor.
Cross Listing: ACCT 430.

IBUS 445/ACCT 445 International Accounting
Credits 3. 3 Lecture Hours.
Introduction and examination of accounting issues unique to multinational enterprises and international business activity. Does not count towards the accounting requirement for the CPA exam.
Prerequisites: ACCT 315 or ACCT 327; FINC 341.

IBUS 446/FINC 445 International Finance
Credits 3. 3 Lecture Hours.
International business transactions, balance of payments and exchange rate systems, exchange rate risk and hedging techniques, sources of funding, relation to international financial institutions and capital instruments; foreign direct investment; international asset and liability management.
Prerequisites: FINC 351 and FINC 361; ACCT 328 or concurrent enrollment.
Cross Listing: FINC 445/IBUS 446.

IBUS 450/ MGMT 450 International Environment of Business
Credits 3. 3 Lecture Hours.
Broad survey of international business issues; analyzes the environment in which international businesses operate; introduces multinational enterprises, global competition, international organizations, treaties and international law, national trade policies and the determinants of competitiveness of firms in international markets.
Prerequisites: Admitted to upper division in Mays Business School.
Cross Listing: MGMT 450/IBUS 450.

IBUS 452/ MGMT 452 International Management
Credits 3. 3 Lecture Hours.
An overview of international management to include international dimensions of organizational behavior, theory, strategy and human resource management; application of theoretical ideas to real-world situations through case analyses, presentations, projects and interactive class discussion.
Prerequisite: MGMT 450/IBUS 450 or MGMT 450/IBUS 450, or concurrent enrollment.
Cross Listing: MGMT 452/IBUS 452.
IBUS 453/MGMT 453 Emerging Economies: Brazil, Russia, India, China
Credits 3. 3 Lecture Hours.
Examination of present and future dynamics of the emerging economies of Brazil, Russia, India and China and their impact on the developing and developed worlds; importance of BRIC countries and their position in the world; history and development of these countries and the current business environment in each.
Prerequisite: MGMT 363.
Cross Listing: MGMT 453/IBUS 453.

IBUS 455 Asian Business Environment
Credits 3. 3 Lecture Hours.
The scope of business environments of Asia; geographical, demographic and cultural elements; financial and communication infrastructures; risk and market analysis; trade and investment patterns; Asian MNC's.
Prerequisite: Admission to upper division in Mays Business School.

IBUS 456 European Integration and Business
Credits 3. 3 Lecture Hours.
History and institutional structure of the European Union; its regional cultures, values, economies and rifts; challenges faced by corporations and people in the region, including issues involving doing business with the European Union.
Prerequisite: Admission to upper division in Mays Business School.

IBUS 457/MGMT 457 Global Entrepreneurship
Credits 3. 3 Lecture Hours.
Practical issues associated with taking small- and medium-size business global, includes importing and exporting, developing global strategies, evaluating market opportunities, regional impact on economies and people.
Prerequisite: Admission to upper division in Mays Business School.
Cross Listing: MGMT 457/IBUS 457.

IBUS 458 International Negotiations
Credits 3. 3 Lecture Hours.
Skill building strategies and exercises in communication, listening and issue identification; how to negotiate globally; importance of knowing people and cultures; practice and theory of effective negotiation; awareness of diverse constructions of reality and communicating across different groups.
Prerequisite: Admission to upper division in Mays Business School.

IBUS 459 Latin American Markets
Credits 3. 3 Lecture Hours.
Comparing and contrasting the Latin American, Canadian and U.S. markets across different variables, including culture, economics, social and legal aspects.
Prerequisite: MKTG 321.

IBUS 460 Academy for Future International Leaders
Credits 3. 3 Lecture Hours.
A practical orientation to international business and cultural issues to prepare selected Texas A&M students for the international marketplace; joint effort among all colleges at Texas A&M; designed to complement any academic major by helping students gain a global perspective of their chosen field of study.
Prerequisite: Junior or senior classification and selection for the Academy for Future International Leaders.

IBUS 484 International Business Internship
Credits 1 to 4. 1 to 4 Other Hours.
International business internship with practicing professionals under the direction of a faculty member.
Prerequisites: Admission to upper division in Mays Business School; approval of department head.

IBUS 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Directed study on selected problems in the area of international business.
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

IBUS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of international business. May be repeated for credit.
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

IDIS - Industrial Distribution (IDIS)

IDIS 240 Introduction to Industrial Distribution
Credits 3. 3 Lecture Hours.
Definition, history, types of industrial distribution; range of products; line of distribution; function of and services provided by distributors; distributor operational and financial analyses; measures of organizational effectiveness; employment and advancement opportunities in the field of industrial distribution.

IDIS 300 Industrial Electricity
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Industrial applications of electrical theory, codes, circuitry, wiring devices, motors and controllers, switch gear and solid state controls.
Prerequisite: Industrial distribution or engineering technology major, junior or senior classification, PHYS 208 or PHYS 219; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better.

IDIS 303 Mechanical Power Transmission
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Overview of the engineering concepts of mechanical power and the components within a system to provide transmission of that power into useful work; experimental application of the related theory as it relates to the industrial distributor; "real world" knowledge learned for application in industry.
Prerequisite: Industrial distribution major, junior or senior classification; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better.

IDIS 330 Sales Engineering
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Sales and sales management techniques for analyzing distribution challenges and providing solutions through effective communication; establishing credibility, effective questioning techniques, developing solutions, presenting solutions, anticipating objections and gaining a commitment, plus techniques for building, developing and compensating an effective sales organization.
Prerequisites: Grade of C or better in IDIS 240 or concurrent enrollment; industrial distribution major.
IDIS 340 Manufacturer Distributor Relations
Credits 3. 3 Lecture Hours.
Approaches and procedures for developing and maintaining effective manufacturer distributor relations: marketing channel design, channel roles, managing uncertainty, legal and ethical imperatives, conflict resolution, decision support and strategic marketing.
Prerequisites: Grade of C or better in IDIS 240 or concurrent enrollment; industrial distribution major.

IDIS 343 Distribution Logistics
Credits 3. 3 Lecture Hours.
Study of concepts, issues and techniques used to plan, analyze and control the logistics network; examination of three key logistical decision-making areas: inventories, facilities and transportation; techniques and technologies for managing and optimizing the logistical (supply) chain.
Prerequisites: Grade of C or better in IDIS 240 or concurrent enrollment; STAT 201, STAT 211 or STAT 303; industrial distribution major.

IDIS 344 Distributor Information and Control Systems
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Industrial distribution systems including hardware and software operations; inventory management, vendor evaluation; physical distribution systems; use of bar codes, radio frequency and other automated data entry techniques; purchasing operations.
Prerequisites: Grade of C or better in IDIS 343; industrial distribution major, junior or senior classification.

IDIS 400 Industrial Automation
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Industrial applications of electronic devices; instrumentation; AC and DC drives; local area networks; cell and area controllers and advanced applications of programmable controllers.
Prerequisites: Grade of C or better in IDIS 300; ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; industrial distribution major, junior or senior classification.

IDIS 403 Fluid Power Transmission
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Engineering concepts of hydraulics and pneumatic power and its components within a system to provide transmission of that power into useful work; experimental application of the related theory as it relates to the industrial distributor; real world knowledge learned for application in industry.
Prerequisites: Grade of C or better in IDIS 303; PHYS 208 or PHYS 219; ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; industrial distribution major, junior or senior classification.

IDIS 420 Contemporary Topics in Electronics Distribution: Going Green
Credits 3. 3 Lecture Hours.
Study of concepts, issues, and techniques used to plan and analyze supply chain for new generation of green products; utilize interdisciplinary approach combining team projects, individual research, case study analysis, and interaction with industry executives; creation of marketing and distribution roadmaps for growth opportunities.
Prerequisites: IDIS 300; IDIS 343; industrial distribution major, junior or senior classification; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better.

IDIS 421 Healthcare Distribution Networks
Credits 3. 3 Lecture Hours.
Examination of the value chain in the health care supply chain; emphasis on distributors in terms of competitive strategy, market power, distinctive capabilities and strategic alliances.
Prerequisites: IDIS 343; industrial distribution major, junior or senior classification; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better.

IDIS 424 Purchasing Applications in Distribution
Credits 3. 3 Lecture Hours.
Applications of purchasing systems, specifically for the distribution industry; emphasis on supplier relations, strategic purchase planning, supplier evaluation, global purchasing techniques, cost analysis, life cycle costing, value analysis; case studies and procurement modeling for distributors.
Prerequisites: Grade of C or better in IDIS 340 and IDIS 343; industrial distribution major, junior or senior classification.

IDIS 433 Industrial Sales Force Development
Credits 3. 3 Lecture Hours.
Techniques and processes for developing, maintaining and leading high performing industrial sales organizations; organization planning and forecasting processes, processes and procedures for identifying and developing talented sales professionals who can operate within a sales process and provide solutions to customers while growing profitable accounts.
Prerequisite: IDIS 330 with a grade of C or better.

IDIS 434 The Quality Process in Distribution
Credits 3. 3 Lecture Hours.
Application of the Deming principles specifically for distributors, including customer needs analysis, research and data collection methodology, employee involvement techniques, team building, statistical methods and data analysis; solutions to quality problems for distributors, lean and six-sigma principles.
Prerequisites: Grade of C or better in MMET 201 and IDIS 344; industrial distribution major, junior or senior classification.

IDIS 444 Ethics and Leadership in Distribution
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Managing change in a dynamic environment in industrial distribution including key success factors involved in firm profitability, issues of a strategic nature; negotiation processes; ethical behavior in achieving economic and social performance.
Prerequisites: Grade of C or better in IDIS 433; industrial distribution major, junior or senior classification.

IDIS 445 International Sales and Marketing
Credits 3. 3 Lecture Hours.
Principles, cultural aspects of selling in the Latin American market, business-to-business selling environment, and marketing products, services and solutions in Latin America; local/country market analysis, strategic marketing, sales planning, alliances and partnerships, and operational support.
Prerequisite: Junior or senior classification.

IDIS 450 Analytics for Distribution Operation
Credits 3. 3 Lecture Hours.
Fundamental concepts in data analytics in distribution operations; using data management tools to process transaction data into useful information; various statistical and analytical models to make strategic decision making; predictive analytics, simulation and risk analysis, linear optimization, and data mining.
Prerequisites: IDIS 343 and IDIS 344 with a grade of "C" or better.
IDIS 454 New Directions in Distributor Competitiveness
Credits 3. 3 Lecture Hours.
Investigation of new research in distributor competitiveness; focus on defining distribution strategy in changing market places; exploration of the latest applied findings and how companies are successfully implementing initiatives; project management approach to demonstrate the development of competitive advantage and design strategies for implementation.
Prerequisites: Junior or senior classification; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better.

IDIS 455 Humanitarian Distribution Networks
Credits 3. 3 Lecture Hours.
Humanitarian logistics; essential knowledge to model distribution systems in humanitarian environments; supplemented by case studies and a project.
Prerequisites: IDIS 343; junior or senior classification; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better.

IDIS 464 Distributor Operations and Financial Management
Credits 3. 3 Lecture Hours.
Assessment of firm performance utilizing financial statement analysis and industry studies; methods for planning, implementing and monitoring profitability from distributor operations; procedures for controlling cash flow; credit, receivables, inventory, personnel and productivity; and related financial operations.
Prerequisites: ACCT 209; grade of C or better in IDIS 343; industrial distribution major, junior or senior classification.

IDIS 481 Seminar - Internship Preparation
Credit 1. 1 Lecture Hour.
Develop an understanding of the distribution industry and its opportunities; prepare students for summer internships; provide students with opportunities to network with industry and companies that will be hiring summer interns.
Prerequisite: Minimum of 60 credit hours.

IDIS 484 Professional Internship
Credits 2. 2 Other Hours.
Independent study and on-the-job supervised experience related to a professional area of interest in industrial distribution.
Prerequisites: IDIS 481; junior or senior classification.

IDIS 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Permits work in a special problem area on an individual basis with the intent of promoting independent reading, research and study; to supplement existing course offerings or subjects not presently covered.
Prerequisites: Senior classification and approval of instructor.

IDIS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of industrial distribution.
Prerequisite: Approval of instructor.

INST-Interdisciplinary Studies (INST)

INST 210 Understanding Special Populations
Credits 3. 3 Lecture Hours.
Referral, assessment and categorization of special populations including physical, cognitive and affective characteristics; cultural, ethnic, economic and linguistic differences; giftedness; special education and compensatory programs; awareness of legislative history that results in rights for special populations.
Prerequisite: Sophomore classification or above.

INST 222 Foundations of Education in a Multicultural Society
Credits 3. 3 Lecture Hours.
Historical, philosophical and cultural foundations of education emphasizing education for a multicultural society.

INST 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in teaching, learning and culture. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

INST 301 Educational Psychology
Credits 3. 3 Lecture Hours.
Application of psychology to problems of teaching. Nature and operation of principles of learning, transfer of training; nature, measurement and significance of individual differences; conditions influencing efficiency of learning.
Prerequisite: Junior or senior classification.

INST 332 Second Language Instruction and Assessment
Credits 3. 3 Lecture Hours.
Techniques and methods of intensive English instruction for Limited English Proficient students; lesson planning and instructional modification; use of instructional strategies and appropriate assessment practices.
Prerequisite: Admission to teacher education.

INST 334 Assessment of English Language Learners
Credits 3. 3 Lecture Hours.
Theoretical and practical aspects of ESL/EFL testing, including formal and informal assessment procedures and instruments, assessments and referral and processes of ESL with special needs, and gifted ESL learners.
Prerequisites: INST 322 and INST 332.

INST 362 English as a Second Language Methods I
Credits 3. 3 Lecture Hours.
Basic principles of language acquisition, multiple approaches to second language acquisition; individual differences and second language acquisition; stages of second language development; multiple approaches to assessment.

INST 363 English as a Second Language Methods II
Credits 3. 3 Lecture Hours.
Strategies and techniques for teaching English language learners; curriculum design and material development, instruction of English language learners, content area instruction, and language assessment instruments; a historical perspective of the education of English language learners in United States’ schools.
Prerequisite: INST 362.
INTS 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in teaching learning and culture. May be repeated 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

INTS - International Studies (INTS)

INTS 201 Introduction to International Studies
Credits 3. 3 Lecture Hours.
Introduction to the basic concepts and frameworks for analyzing global events and understanding the current international situation; for freshman and transfer international studies majors.

INTS 205 Current Issues in International Studies
Credit 1. 1 Lecture Hour.
Exploration of current issues and problems in International Studies through attendance of events, lectures by noted international academics and professionals, and in-class discussions. May be taken three times for credit.
Prerequisite: International studies major.

INTS 211/ENGL 211 Foundations in Cultural Studies
Credits 3. 3 Lecture Hours.
Introduction to history, influence and major ideas of Cultural Studies; use of culture as a means to critique social problems and understand social forces; analysis of culture in its relationship to power; participation in project investigating contemporary U.S. youth subcultures.
Cross Listing: ENGL 211/INTS 211.

INTS 215 Global Cinema
Credits 3. 3 Lecture Hours.
History and theory of global cinema; historical, socio-political, national and international contexts of film production and reception; transnational film.
Cross Listing: FILM 215.

INTS 251 Contemporary Issues in the Middle East
Credits 3. 3 Lecture Hours.
Exploration of current political and cultural issues in the Middle East.

INTS 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Individual supervision of readings or assigned projects in international studies. May be taken two times for credit.
Prerequisites: Approval of instructor and department head.

INTS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Introduction to the broad range of disciplines and issues explored in the international studies curriculum. May be repeated for credit.
Prerequisite: Freshman or sophomore classification.

INTS 301 Theories of Globalization
Credits 3. 3 Lecture Hours.
Diverse global and international cultural processes in their economic and political contexts; analyses of theoretical lenses on transnationalism including diaspora, hybridity, liminality, marginality, cyborgism, nomadism, scapes and flows and others; case studies of global cultures.
Prerequisite: Junior or senior classification or approval of instructor.

INTS 321 Political Islam and Jihad
Credits 3. 3 Lecture Hours.
Interaction between Islamic movements and politics in various Middle Eastern countries; the meaning and evolution of jihad; the role of Islam as a tool for political and social mobilization.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: HUMA 321 and RELS 321.

INTS 401 Urbanism and Modernism
Credits 3. 3 Lecture Hours.
Interdisciplinary examination of the transition from rural traditions to urban alienation, covering modernist currents in culture, history, politics, and society; exploration of the problems of urbanism as represented by the most renowned twentieth-century artists; study of such topics as modernist urban design, urban alienation, modernist cities, dystopia, and urbanism.
Prerequisites: International studies major; INTS 201.

INTS 403 Nations and Nationalisms
Credits 3. 3 Lecture Hours.
Interdisciplinary approach where nation is understood as modern political entity distinct from country; examination of historical and philosophical origins of idea of nationalism; theories on nationhood, national identity and rise of nationalism; global variety of concrete test cases to highlight actual functions (wars, decolonization, symbolic representations in film, etc.).
Prerequisites: International studies major; INTS 201.

INTS 405 War and Memory
Credits 3. 3 Lecture Hours.
Examination of world wars, colonial wars, genocides, and historical crimes from the late nineteenth century until the present; analysis of the changing memory of those traumatic events as evident in historical accounts, commemorations, film, and literature.
Prerequisites: International studies major; INTS 201.

INTS 407 Diversity in a Globalized World
Credits 3. 3 Lecture Hours.
Examination of the cultural constructs that arise through the encounters with colonialism from the conquest of the Americas to the present; cultural studies and literary analysis to identify and interrogate the common principles of human interaction in the face of cultural diversity.
Prerequisites: International studies major; INTS 201.

INTS 409 Culture, Neoliberalism and Globalism
Credits 3. 3 Lecture Hours.
Examination of largely North Atlantic cultural forms and meanings that arise in the context of neoliberalism from the late 1970's to the present; cultural studies and broad-based social analysis to identify and interrogate the many relational contexts where power circulates through cultural objects and meanings.
Prerequisites: INTS 201; international studies major; junior or senior classification.

INTS 410 Gender and the Global Modern
Credits 3. 3 Lecture Hours.
Relationship of the concepts of gender and modernity in the 20th and the 21st centuries from an international perspective; global theories of gender and sex across genres.
Prerequisites: INTS 201; junior or senior classification or approval of instructor.
INTS 481 Senior Seminar in International Studies
Credits 3. 3 Lecture Hours.
Capstone course designed to produce in-depth research projects; based on student's international experience and specific area of expertise acquired in major.
Prerequisites: International Studies major; INTS 201; senior classification; completed international experience.

INTS 484 Directed Internship
Credits 0 to 3. 0 to 3 Other Hours.
Directed internship in a private firm, government or non-profit agency outside the United States; provide on-the-job experience appropriate to the student's program of work and career objectives. To be taken on a satisfactory/unsatisfactory basis. Maximum of 3 credit hours may count towards degree.
Prerequisites: Completion of 100- and 200-level language requirement; junior or senior classification; approval of internship coordinator.

INTS 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Research problems and readings for students majoring in international studies; directed independent study of an international issue related to student's area of interest.
Prerequisite: Junior or senior classification or approval of instructor.

INTS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of international studies. May be repeated for credit.
Prerequisite: Junior or senior classification or approval of instructor.

INTS 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in international studies.
Prerequisites: INTS 201; junior or senior classification and approval of instructor.

INTS 497 Independent Honors Study
Credits 3. 3 Other Hours.
Directed independent studies designed to produce a senior honors thesis; based on international experience and interdisciplinary expertise acquired in major.
Prerequisites: INTS major; honors candidate; completed international experience.

ISEN - Indust & Systems Engr (ISEN)

ISEN 101 Introduction to Industrial Engineering
Credit 1. 1 Lecture Hour.
Introduction to industrial engineering; overview of the curriculum; presentations by faculty and industry to familiarize with the department and the scope of industrial engineering applications.

ISEN 210 Fundamentals of Industrial Engineering Design
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Engineering design for product development, problem definition and need identification, information gathering and concept generation, decision making and concept selection; industrial engineering concepts including design for manufacturing, assembly, sustainability and environment; economic decision making and cost evaluation; risk, reliability and safety; quality; robust design and optimization.
Prerequisite: ENGR 112.

ISEN 230 Informatics for Industrial Engineers
Credits 3. 3 Lecture Hours.
Structured programming concepts for implementing mathematical and statistical models in industrial engineering problems; emphasis on introductory production and service system problems and computer-based approaches to solve the problems; engineering applications of probability and statistics concepts.
Prerequisite: CSCE 206 or CSCE 111 or CSCE 121 or equivalent.
Concurrent enrollment in STAT 211.

ISEN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Problems of limited scope in industrial engineering approved on an individual basis intended to promote independent study.
Prerequisite: Approval of department head.

ISEN 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in industrial and systems engineering. May be taken four times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ISEN 302 Economic Analysis of Engineering Projects
Credits 2. 2 Lecture Hours.
Principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and after-tax analysis of economic projects.
Prerequisite: MATH 152.

ISEN 303 Engineering Economic Analysis
Credits 3. 3 Lecture Hours.
Principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and tax implications; certainty; uncertainty; risk analysis; public sector analysis and break-even concepts.
Prerequisite: MATH 152.

ISEN 310 Uncertainty Modeling for Industrial Engineering
Credits 3. 3 Lecture Hours.
Models and methods based on probability and statistics for industrial engineering applications; random variables, expectation, distribution fitting, reliability of systems, central limit theorem and interval estimates in the context of production and service systems.
Prerequisites: ISEN 230 and STAT 211; junior or senior classification.

ISEN 320 Operations Research I
Credits 3. 3 Lecture Hours.
Development and application of fundamental deterministic optimization models and solution methods; focus on quantitative modeling and formulation of linear, integer, and network flow problems; use of computer optimization software to model and solve real-life problems.
Prerequisites: MATH 304; junior or senior classification.

ISEN 330 Human Systems Interaction
Credits 3. 3 Lecture Hours.
Principles of human factors and ergonomics; emphasis on design to support human capabilities, limitations, and interaction tendencies in sociotechnical work systems; topics include human information processing, physiological and biomechanical functioning, and implications for design of the workplace and jobs; case studies in manufacturing, medicine, aerospace, ground transportation, and computer interaction.
Prerequisites: MMET 181; junior classification.
ISEN 340 Operations Research II  
Credits 3. 3 Lecture Hours.  
Probabilistic methods for industrial and service systems; stochastic processes used in industrial engineering, including Poisson processes and discrete and continuous-time Markov chains; applications to production operations, inventory control, revenue management, quality control, reliability, digital simulation and finance.  
Prerequisites: MATH 304 and ISEN 310; junior or senior classification.

ISEN 350 Quality Engineering  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Strategic approach to implementing quality, process and business improvement methods using data analysis tools; total quality management and six sigma approaches to define, measure, analyze, improve and control processes; principles of lean engineering; control charts; process capability analysis; basic metrology, applied statistics, lean principles and process capability.  
Prerequisites: ISEN 310 and ISEN 230; junior or senior classification.

ISEN 355 System Simulation  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Systems simulation structure, logic and methodologies; development of simulation models; data handling methods; analysis of simulation data; verification and validation; system simulation languages, models and analysis; applications to industrial situations.  
Prerequisites: ISEN 230 and ISEN 310; junior or senior classification.

ISEN 360 Lean Thinking and Lean Engineering in the Process Industries  
Credits 3. 3 Lecture Hours.  
Philosophical, managerial, and operational principles of lean thinking within the context, tools, and practices of lean engineering; emphasis on the pharmaceutical and process industry; design of lean systems, lean cell design, modeling of lean manufacturing systems, and operation of manufacturing cells; queuing network theory for the analysis of lean systems.  
Prerequisites: STAT 211; junior or senior classification for students other than INEN majors.

ISEN 370 Production Systems Engineering  
Credits 3. 3 Lecture Hours.  
Principles, models, and techniques for planning and analysis of production and distribution systems; application of linear, integer, and nonlinear optimization models and solution methods for aggregate planning, supply chain planning, push (MRP) and pull (JIT) material flow management, inventory control under deterministic and stochastic demands, operations scheduling, and production scheduling.  
Prerequisites: ISEN 230 and ISEN 320; junior or senior classification.

ISEN 399 Professional Development  
Credits 0. 0 Other Hours.  
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.  
Prerequisites: ISEN 210 and ISEN 230; junior or senior classification or approval of instructor.

ISEN 405 Facilities Design and Material Handling  
Credits 3. 3 Lecture Hours.  
Principles of facilities location, layout, and material handling systems and to practice designing facilities; modeling, design, and analysis techniques; methodologies in facilities location, layout, and material handling; integration of ergonomics analysis techniques and their implications on design, layout, safety and quality.  
Prerequisites: ISEN 210 and ISEN 320; junior or senior classification.

ISEN 408 Supply Chain and Logistics  
Credits 3. 3 Lecture Hours.  
Principles, models and techniques for planning, analysis and design of supply chain systems; optimization principles, including linear and integer programming, applied to supply chain planning and operations; information technology, design models, databases, and strategic and tactical decision making.  
Prerequisites: ISEN 320, ISEN 340, and ISEN 370; junior or senior classification.

ISEN 410 Advanced Engineering Economy  
Credits 3. 3 Lecture Hours.  
Principles of economic equivalence; borrowing, lending, and investing; establishing minimum attractive rate of return; replacement analysis; capital budgeting; uncertainty analysis; decision trees.  
Prerequisites: ISEN 210 or ISEN 302; junior or senior classification.

ISEN 411 Engineering Management Techniques  
Credits 3. 3 Lecture Hours.  
Techniques relating to managing engineering activities; engineer’s transition into management; engineering managerial functions; motivation of individual and group behavior; productivity assessment/ improvement; managing the quality function and communications.  
Prerequisite: Senior classification in industrial engineering.

ISEN 413 Advanced Data Analytics for Industry  
Credits 3. 3 Lecture Hours.  
Data mining; linear discriminant analysis (LDA), principal component analysis (PCA) and other methods; classification, clustering, and mining, information extraction; dealing with uncertainty, Bayesian inference; neural models, regression and feature selection.  
Prerequisites: ISEN 310 and ISEN 350; junior or senior classification.

ISEN 414 Total Quality Engineering  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Principles of total quality engineering; total quality management philosophy, engineering approaches for designing quality into products and processes; off-line experimentation methods for the robust design; emphasis on teamwork and continuous quality improvement.  
Prerequisite: STAT 211; junior or senior classification.

ISEN 416 Facilities Location, Layout and Material Handling  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Analytical treatment of facilities location, physical layout, material flow and handling, combined with heuristic algorithms to assist in the design of production/service facilities; fundamental concepts applied through a sequence of design projects.  
Prerequisites: ISEN 315; ISEN 316 or registration therein.

ISEN 425 Design and Analysis of Industrial Systems with Simulation  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
In-depth study into the design-modeling and subsequent analysis of contemporary production/service systems; factory/service systems are modeled using the ARENA/SIMAN V simulation-animation language; emphasis is placed on the critical analysis of alternative flow designs of modeled systems using flow and economic parameters to assess system improvement.  
Prerequisites: ISEN 303 and ISEN 424.

ISEN 434 Human Error and System Failures  
Credits 3. 3 Lecture Hours.  
Human error from a sociotechnical systems perspective; role of error in complex system failures; human behavioral modes and system design factors; analytical methods for defining the roles and impact of errors in large-scale system accidents; real-world case studies.  
Prerequisites: ISEN 330; junior or senior classification.
ISEN 440 Systems Thinking
Credits 3. 3 Lecture Hours.
Systems thinking process, systems of systems and the fundamental considerations associated with the engineering of large-scale systems, or systems engineering including systems modeling, design and the system development process.
Prerequisites: MATH 304 or approval of instructor; junior or senior classification.

ISEN 442 Organizational Systems
Credits 3. 3 Lecture Hours.
Role of people and organizations in the design and development of complex engineered systems; providing engineers with the skills needed to effectively manage large-scale system development programs.
Prerequisites: ISEN 330; junior or senior classification.

ISEN 450 Healthcare Systems Engineering
Credits 3. 3 Lecture Hours.
Explores components of healthcare system, existing problems in healthcare systems; need for engineering to analyze healthcare system problems; application of industrial engineering tools in improving healthcare system; role of industrial engineering in addressing healthcare policy issues.
Prerequisites: ISEN 314, ISEN 420, ISEN 424, or approval of instructor; junior or senior classification.

ISEN 453 Manufacturing Operations
Credits 3. 3 Lecture Hours.
Analytical principles of manufacturing systems design, analysis and control; emphasis placed on stochastic analysis; role of variability and impact on cycle time; push versus pull production strategies including Kanban and constant WIP control; probability, queuing theory, Little's Law, heavy traffic approximations, and queuing networks.
Prerequisites: ISEN 340; junior or senior classification.

ISEN 460 Capstone Senior Design
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Engineering design including identification of a problem; development, analysis and evaluation of alternative solutions; and recommendations for and, where possible, development of systems improvement tools; application of experience and training to provide a product or solution that helps company clients; balancing client needs with academic requirements.
Prerequisite: ISEN 340, ISEN 350, ISEN 355 and ISEN 370; junior or senior classification.

ISEN 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Permits work on special project in industrial engineering. Project must be approved by department head.
Prerequisite: Senior classification in industrial engineering.

ISEN 489 Special Topics in...
Credits 1 to 5. 1 to 5 Lecture Hours. 0 to 5 Lab Hours.
In-depth study of areas of current student interest and recent advances; normally used for first time offering of new courses.
Prerequisite: Approval of instructor.

ISEN 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in industrial and systems engineering. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

ISTM - Mgmt Info Systems (ISTM)

ISTM 209 Business Information Systems Concepts
Credits 3. 3 Lecture Hours.
Introduction to the use of computers in data and document management and as a problem-solving tool for business; fundamental concepts of information technology and theory; opportunities to use existing application software to solve various business information systems oriented problems. May not be used to satisfy degree requirements for majors in business.
Prerequisite: For students other than business and agribusiness majors.

ISTM 210 Fundamentals of Information Systems
Credits 3. 3 Lecture Hours.
Introduction to information systems concepts; study of information systems in the functional areas of business; overview of hardware, software and popular operating systems; study of problem solving tools; human factors.
Prerequisite: For business majors.

ISTM 250 Business Programming Logic and Design
Credits 3. 3 Lecture Hours.
Development of structured and object-oriented program logic and design in solving business programming problems; writing, documenting, debugging and testing computer code; emphasis on good coding techniques and logical thinking.
Prerequisite: ISTM 210 or approval of instructor.

ISTM 281 Professional Development Information Systems Seminar
Credit 1. 1 Other Hour.
Exposure to professional issues, contemporary information systems topics, potential MIS careers and employers. May be taken three times for credit.
Prerequisite: Admission to Mays Business School; intend to major in management information systems.

ISTM 310 Network Communications and Infrastructure
Credits 3. 3 Lecture Hours.
Concepts, technologies and applications of on-line and network-based systems; analysis and design of data communications; requirements in an information system environment; impact on business organizations; installation, configuration and management of virtual servers.
Prerequisite: ISTM 250; admission to upper division in Mays Business School.

ISTM 315 Database Programming
Credits 3. 3 Lecture Hours.
Use and application of Structured Query Language (SQL); Database Management Systems (DBMS) in the solution of business problems; database programming.
Prerequisites: ISTM 310; ISTM 320; or approval of instructor.

ISTM 320 Business Systems Analysis and Design
Credits 3. 3 Lecture Hours.
Techniques and methods currently used in system analysis and design including object oriented methods; use of automated tools to support systems development.
Prerequisite: ISTM 250; admission to upper division in Mays Business School.
ISTM 325 Business Object Oriented Programming with Java
Credits 3. 3 Lecture Hours.
Introduction of abstract data types, inheritance, object identity, polymorphism as they relate to building business objects and business classes; use of Java programming language depicting the object orientation concepts; use of class libraries and Java packages for business object construction.
Prerequisites: Admission to upper division in Mays Business School; ISTM 250.

ISTM 370/SCMT 370 Introduction to Energy Industry
Credits 3. 3 Lecture Hours.
History of the modern Oil & Gas Industry; ecosystem of companies driving the industry; operations involved in exploration, production, refining, trading, pipeline, and retail in bringing oil to market; accounting and economics of the industry; issues and solutions in supporting supply chain; discussion of technology innovations occurring in the industry.
Prerequisite: Admission to upper division in Mays Business School.
Cross Listing: SCMT 370/ISTM 370.

ISTM 410 Management of Information Systems
Credits 3. 3 Lecture Hours.
Strategic management of information systems; change and risk management processes during information systems implementation; role of information systems to support business goals; writing business cases for request for proposals and responses; project management techniques.
Prerequisite: ISTM 310; ISTM 320; or approval of instructor.

ISTM 415 Information Systems Capstone Project
Credits 3. 3 Lecture Hours.
Design and development of information system software based on technical specifications; multi-platform environment; database server and web server software deployment.
Prerequisites: ISTM 315; ISTM 410; or approval of instructor.

ISTM 420 Web-Enabled Applications
Credits 3. 3 Lecture Hours.
Distributed business applications using the World Wide Web; advanced discussions of the concepts of internet, intranet, extranet; different methods to design web-enabled applications; active web applications; cutting edge website design; legacy to web integration; use of web-oriented languages.
Prerequisites: ISTM 315.

ISTM 425 Complex Business Application Design
Credits 3. 3 Lecture Hours.
Business application development alternatives; COM and CORBA object models; use of Visual Basic; use of ActiveX controls, ActiveX Servers and ActiveX Documents.
Prerequisites: ISTM 250; senior classification.

ISTM 450 Business Intelligence and Data Mining
Credits 3. 3 Lecture Hours.
Rationale for Business Intelligence and data mining through business case studies; lab training using data mining software; and process of data mining by using commercial data mining software on large data sets.
Prerequisites: Grade of "C" or better in SCMT 303 or equivalent; junior or senior classification.

ISTM 455 Business Information Security and Risk Management
Credits 3. 3 Lecture Hours.
Explores business, managerial and technological aspects of information security; analysis, design, implementation and management issues surrounding effective information security; includes risk management, business continuity planning, security policy development.
Prerequisite: ISTM 310.

ISTM 460 E-Services
Credits 3. 3 Lecture Hours.
Examines the deployment and utilization of information technologies by businesses, governments and not for profit organizations to deliver services, with applications in banking and financial advisory services, healthcare, and federal, state and local governments.
Prerequisite: Senior classification in business or approval of instructor.

ISTM 481 Information Systems Seminar
Credit 1. 1 Other Hour.
Exposure to professional issues, contemporary information systems topics, potential MIS careers and employers. May be taken three times for credit.
Prerequisite: Admission to upper division in Mays Business School; or approval of instructor.

ISTM 484 Management Information Systems Internship
Credits 1 to 4. 1 to 4 Other Hours.
A directed internship in an organization to provide students with a learning experience supervised by professionals in organizational settings appropriate to the student's professional objectives. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Management Information Systems major and approval of academic advisor and instructor.

ISTM 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study of selected problems in an area of management information systems not covered in other courses.
Prerequisites: Admission to upper division in Mays Business School and approval of academic advisor and instructor.

ISTM 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topic in an identified field of management information systems.
Prerequisites: Admission to upper division in Mays Business School and approval of academic advisor and instructor.

ISTM 601 Fundamentals of Business Programming
Credits 3. 3 Lecture Hours.
Business Application Development using both procedural and object-oriented programming techniques; use of component based software design and development for distributed business software systems.
Prerequisite: Graduate business classification or approval of instructor.

ISTM 610 Business Data Communications
Credits 3. 3 Lecture Hours.
Concepts and technology of on-line and network-based systems in business; analysis of data communication requirements, design, selection and application of network technologies including wide and local area networks, distributed processing, network architecture, and systems management and control; software simulation projects emphasized. Classification 6 students may not enroll in this course.
Prerequisites: Graduate classification.
ISTM 612 Management Information Systems  
Credits 1 to 3. 1 to 3 Lecture Hours.  
Concepts, theories, and the strategic role of information systems as applied to business organizations; highly integrative/cross functional in nature. Classification 6 students may not enroll in this course.  
Prerequisite: Enrollment is limited to MBA students.

ISTM 615 Business Database Systems  
Credits 3. 3 Lecture Hours.  
Information processing and management involving applications and user orientation in a business environment using commercially available database management systems.  
Prerequisite: Knowledge of one programming language.

ISTM 620 Systems Analysis and Design  
Credits 3. 3 Lecture Hours.  
Methodologies, techniques, and tools for information systems analysis and design; the analysis and logical design of business processes and management information systems focusing on the systems development life cycle; techniques for logical system design.  
Prerequisite: ISTM 615 or concurrent enrollment.

ISTM 622 Advanced Data Management  
Credits 3. 3 Lecture Hours.  
Data/database management and advanced SQL techniques; issues of data security, backup and recovery, large scale databases, master data management, concurrent user data access, scalability, and policies.  
Prerequisites: ISTM 615 or equivalent; graduate classification in business.

ISTM 624 Advanced Systems Analysis and Design  
Credits 3. 3 Lecture Hours.  
Advanced topics in business systems analysis and design; alternative methodologies such as agile development, extreme programming, Rational Unified Process; Unified Modeling Language; bench marking and best practices for systems development; cost/benefit analysis, estimation and budgeting for business information systems; testing; patterns, domain-driven design; process modeling; service-oriented architecture and cloud computing.  
Prerequisite: ISTM 620 or equivalent; graduate classification in business.

ISTM 630 MIS Project Management and Implementation  
Credits 3. 3 Lecture Hours.  
Advanced coverage of systems development topics with emphasis on the management and implementation of business computing systems; group project orientation to include feasibility analysis, alternative evaluation and selection, and management approval; use of software engineering tools where appropriate. Classification 6 students may not enroll in this class.  
Prerequisite: ISTM 620.

ISTM 631 Information Systems Design and Development Project  
Credits 3. 3 Lecture Hours.  
Design and delivery of functional, multi-platform application system using current technologies; user interface design emphasized; issues of mobile device forms, software delivery, and development.  
Prerequisites: Graduation classification; ISTM 622; ISTM 630.

ISTM 635 Business Information Security  
Credits 3. 3 Lecture Hours.  
Explores the business, managerial, and technological aspects of information security; analysis, design, and implementation issues surrounding effective information security; authentication, authorization, availability, business continuity planning, confidentiality, disaster recovery, encryption, firewalls, fraud protection, security policy development, integrity, risk management, virus protection, VPNs and wireless security. Classification 6 students may not enroll in this course.  
Prerequisite: ISTM 610.

ISTM 637 Data Warehousing  
Credits 3. 3 Lecture Hours.  
Provides an understanding of the process by which a data warehouse system is designed and developed along with the underlying concepts and software systems; includes OLAP models and their differences with standard OLTP models.  
Prerequisite: ISTM 615 or approval of instructor.

ISTM 640 Information Systems Sourcing  
Credits 3. 3 Lecture Hours.  
Identify the challenges of information systems sourcing, as well as the costs, risks, rewards, and strategies involved in sourcing situations; focus on global sourcing of professional services, including IT, business process, and knowledge process outsourcing; issues such as vendor management, legal issues, distributed work teams, and comparing alternative sourcing strategies.  
Prerequisites: ISTM 624 or equivalent or approval of instructor; graduate classification in business.

ISTM 643 Corporate Information Planning  
Credits 3. 3 Lecture Hours.  
Concepts regarding the design and use of computer-based management information and decision support systems; combinations of computing hardware and software and design concepts evaluated to meet managers’ information needs. Classification 6 students may not enroll in this course.  
Prerequisites: ISTM 615 or equivalent or approval of instructor.

ISTM 645 IT Security Controls  
Credits 3. 3 Lecture Hours.  
Familiarization with planning, design, and implementation of controls to minimize risks to business information; focus on the importance of managing business information security; introduction to the tools, concepts and theories to safeguard an organization’s information systems and IT assets; understanding of cryptography and application, operations, and physical security.  
Prerequisite: ISTM 635.

ISTM 646 E-Services  
Credits 3. 3 Lecture Hours.  
Examines the deployment and utilization of information technologies by businesses, governments and not-for-profit organizations to deliver services, with applications in banking and financial advisory services, healthcare, and federal, state and local governments.  
Prerequisite: ISTM 620.

ISTM 650 Business Data Mining  
Credits 3. 3 Lecture Hours.  
Rationale for business Data Mining through case studies of business applications; process of data mining by using commercial Data Mining software on very large data sets; half of the course devoted to lab training in the use of Data Mining software including SAS Enterprise Miner and SPSS Clementine.  
Prerequisite: STAT 652 or approval of instructor.
ISTM 652 Customer Relationship Management and Technologies
Credits 3. 3 Lecture Hours.
Theory and application of information technology in customer relationship management, construction of CRM infrastructures in organizations.
Prerequisite: ISTM 615.

ISTM 654 E-Commerce Technologies
Credits 3. 3 Lecture Hours.
Theory and application of constructing E-Commerce sites, including n-tier architecture and technologies, web servers, server interactions with databases, and transaction managers.
Prerequisite: ISTM 615 or equivalent.

ISTM 655 Security Management and Compliance
Credits 3. 3 Lecture Hours.
Familiarization with managerial and legal aspects of business information security; focus on importance of managing business information security and theories to help safeguard an organization's information systems and IT assets; understanding of Security Architecture and Design, Business Continuity and Disaster Recovery Planning, Laws Investigation and Ethics.
Prerequisite: ISTM 635.

ISTM 656 Global Information Systems
Credits 3. 3 Lecture Hours.
Impact and the central role of Information Systems (IS) on globalization of business; issues of deployment of information systems and technology in international commerce, global IS environmental variables such as technology, legal, political, economic, social and cultural. Classification 6 students may not enroll in this course.
Prerequisite: ISTM 610 or equivalent, or approval of instructor.

ISTM 657 IT Consulting
Credits 3. 3 Lecture Hours.
Concerns with the practice of IT consulting; and develops an understanding of consulting practices, business development and revenue management, client relationships, team-based knowledge, knowledge services, technology evaluation, selection and integration, collaboration tools, business process and organizational change, and large application implementations; involves a full semester client-based project.
Prerequisites: ISTM 615, ISTM 620, and SCMT 660, and approval of instructor.

ISTM 684 Professional Internship
Credits 1 to 6. 1 to 6 Other Hours.
A directed internship in an organization to provide students with on-the-job training with professionals in organizational settings appropriate to the student's professional objectives. May be repeated for credit. Classification 6 students may not enroll in this course.
Prerequisite: Approval of committee chair and department head.

ISTM 685 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study on selected problems using recent developments in business research methods. Classification 6 students may not enroll in this course.
Prerequisite: Approval of instructor and graduate advisor.

ISTM 686 Theory and Research in Management Information Systems
Credits 3. 3 Lecture Hours.
Theory, applications and human and organizational issues of Management Information Systems (MIS); current academic research into the analysis, design and implementation of computer information systems. Classification 6 students may not enroll in this course.
Prerequisites: Doctoral classification and approval of instructor.

ISTM 689 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in identified area of information systems, operations management or management science. Classification 6 students may not enroll in this course. May be repeated for credit.

ITAL - Italian (ITAL)

ITAL 101 Beginning Italian I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(ITAL 1411) Beginning Italian I. Elementary language study with oral, written and reading practice; preparation for conversation; part of class preparation will be done in language laboratory.

ITAL 102 Beginning Italian II
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(ITAL 1412) Beginning Italian II. Continuation of ITAL 101; part of class preparation will be done in the language laboratory.
Prerequisite: ITAL 101.

ITAL 201 Intermediate Italian I
Credits 3. 3 Lecture Hours.
(ITAL 2311) Intermediate Italian I. Readings of average difficulty; review of grammar; practice in conversation and composition.
Prerequisite: ITAL 102.

ITAL 202 Intermediate Italian II
Credits 3. 3 Lecture Hours.
(ITAL 2312) Intermediate Italian II. Continuation of ITAL 201 with more advanced material.
Prerequisite: ITAL 201.

ITAL 285 Directed Studies
Credits 1 to 4. 1 to 4 Lecture Hours.
Individual supervision of readings or assigned projects in Italian, selected for each student individually.
Prerequisites: Approval of instructor and department head.

ITAL 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Italian studies. May be repeated for credit.
Prerequisite: ITAL 202 or equivalent.

ITAL 303 Composition and Conversation
Credits 3. 3 Lecture Hours.
Readings of contemporary Italian prose; intensive review of grammar and syntax; development of written and oral skills; expansion of vocabulary; translations, compositions and short presentation.
Prerequisite: ITAL 202 or equivalent.
ITAL 451/EURO 451 Introduction to Italian Culture
Credits 3. 3 Lecture Hours.
Introduction to the culture of the Italian Peninsula, from Middle Ages to present; study of major works of literature, political science, visual arts, music and cinema, to set Italy's culture in its social and historical context; taught in English.
Prerequisite: ITAL 201 or registration therein, or approval of instructor.
Cross Listing: EURO 451/ITAL 451.

ITAL 452/WGST 452 Women and Gender in Italy
Credits 3. 3 Lecture Hours.
The historical and cultural dynamics forging the notion of woman and gender in Italian society and cultural production; discussion of cultural works, media and theoretical texts concerning subjectivity and language, body and culture; taught in English.
Prerequisite: ITAL 201 or concurrent enrollment or approval of instructor.
Cross Listing: WGST 452/ITAL 452.

ITAL 453/EURO 453 Italian Literature
Credits 3. 3 Lecture Hours.
Survey of Italian literature; focus on literary portrayal of reality in modern and contemporary Italian culture, the dialogue with the classical tradition, and literature's potential to affect and be affected by social critique; taught in English.
Prerequisite: ITAL 201 or registration therein, or approval of instructor.
Cross Listing: EURO 453/ITAL 453.

ITAL 454/EURO 454 Italian Drama
Credits 3. 3 Lecture Hours.
Study of Italian dramatic literature from the origins of Italian theater to the contemporary stage; analysis of the link between theater, opera, and film; taught in English.
Prerequisite: ITAL 201 or registration therein or approval of instructor.
Cross Listing: EURO 454/ITAL 454.

ITAL 455/FILM 455 Italian Cinema
Credits 3. 3 Lecture Hours.
Survey of Italian cinema from Neorealism to the present; taught in English.
Prerequisite: Junior or senior classification, or approval of instructor.
Cross Listing: FILM 455/ITAL 455.

ITAL 456/EURO 456 Contemporary Italy
Credits 3. 3 Lecture Hours.
Examination of changes in Italian society and culture since World War II, with focus on their narration and interpretation by representative authors and filmmakers, and on multicultural literary production in present-day Italy; taught in English.
Prerequisite: ITAL 201 or registration therein or approval of instructor.
Cross Listing: EURO 456/ITAL 456.

ITAL 457/EURO 457 Italian Urban Cultures
Credits 3. 3 Lecture Hours.
Italian cities in a social, historical, transnational and global perspective; geopolitical and eco-literary theory; literature, visual arts, music and cinema; taught in English.
Prerequisites: ITAL 201; junior or senior classification or approval of instructor.
Cross Listing: EURO 457/ITAL 457.

ITAL 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports.
Prerequisite: Approval of instructor and department head.

ITAL 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Italian. May be repeated for credit.
Prerequisite: Approval of instructor.

JAPN - Japanese (JAPN)

JAPN 101 Beginning Japanese I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(JAPN 1411) Beginning Japanese I. Elementary language study with oral, written and reading practice; preparation for conversation; part of class preparation to be done in the language laboratory.

JAPN 102 Beginning Japanese II
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(JAPN 1412) Beginning Japanese II. Continuation of JAPN 101; part of class preparation to be done in the language laboratory.
Prerequisite: JAPN 101.

JAPN 110 Functional Japanese: History and Culture
Credits 3. 3 Lecture Hours.
Designed to complement beginning Japanese courses; emphasis on oral production and ability to function in a variety of real-life situations; includes survey of Japanese history.
Prerequisite: Ability to read Hiragana and Katakana.

JAPN 201 Intermediate Japanese I
Credits 4. 4 Lecture Hours.
Readings of average difficulty; review of grammar; practice in conversation and composition.
Prerequisite: JAPN 102.

JAPN 202 Intermediate Japanese II
Credits 4. 4 Lecture Hours.
Continuation of JAPN 201 with more advanced material.
Prerequisite: JAPN 201.

JAPN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects in Japanese, selected for each student individually; written or oral reports.
Prerequisite: Approval of instructor and Director of AALO.

JAPN 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Japanese studies. May be repeated for credit.
Prerequisite: Approval of instructor.

JAPN 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research in Japanese studies conducted under the direction of faculty member approved by the Director of AALO. May be taken 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

JAPN 301 Upper Level Japanese I
Credits 3. 3 Lecture Hours.
Reading and listening practice using authentic and near-authentic materials; conversation practice in different levels of formality; composition and grammar; conducted in Japanese.
Prerequisite: JAPN 202.
JAPN 302 Upper Level Japanese II
Credits 3.3 Lecture Hours.
Continuation of JAPN 301 with more advanced material.
Prerequisite: JAPN 301.

JAPN 325 Japanese Language and Culture through Manga
Credits 3.3 Lecture Hours.
Examination of Japanese and Asian visual, linguistic, and cultural traditions, with emphasis on genre of Manga.
Prerequisite: JAPN 202.

JAPN 401 Advanced Japanese I
Credits 3.3 Lecture Hours.
Readings with selected grammar and kanji lessons; focus on Japanese traditional and popular culture, religion, and history; taught in Japanese.
Prerequisite: JAPN 302 or equivalent.

JAPN 402 Advanced Japanese II
Credits 3.3 Lecture Hours.
Readings with selected grammar and kanji lessons; focus on Japanese private and business life, education, politics, and contemporary culture; taught in Japanese.
Prerequisite: JAPN 302 or equivalent.

JAPN 485 Directed Studies
Credits 1 to 4.1 to 4 Other Hours.
Individual supervision of readings or assigned projects selected for each student individually; written or oral reports.
Prerequisite: Approval of instructor and Director of AALO.

JAPN 489 Special Topics in...
Credits 1 to 4.1 to 4 Lecture Hours.
Selected topics in an identified area of Japanese studies. May be repeated for credit.
Prerequisite: Approval of instructor.

JAPN 491 Research
Credits 1 to 4.1 to 4 Other Hours.
Research in Japanese studies conducted under the direction of faculty member approved by the Director of AALO. May be taken 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

JOUR - Journalism (JOUR)

JOUR 102 American Mass Media
Credits 3.3 Lecture Hours.
(COMM 1307) American Mass Media. Introductory survey of mass communication media, their history and social role, to provide an understanding of the development and importance of mass communication media in modern society.
Prerequisite: Freshman or sophomore classification, or approval of program director.

JOUR 200 Mass Media Information
Credits 3.3 Lecture Hours.
Strategies and procedures in identifying, gathering, analyzing and organizing information for the mass media; sources and methods; evaluation and validation of evidence; legal and ethical considerations.
Prerequisites: JOUR 102 with a grade of B or better, 80 percent on the GSP test or SAT or ACT equivalent, 2.5 GPR or higher, and freshman or sophomore classification; or approval of program director.

JOUR 203 Media Writing I
Credits 3.2 Lecture Hours. 3 Lab Hours.
(COMM 2311) Media Writing I. Basic journalistic techniques common to all media; integration of news gathering, writing and editing; ethics. Limited to minors in journalism, or with approval of program director.
Prerequisites: JOUR 102 and JOUR 200, freshman or sophomore classification and enrollment in journalism minor; or approval of program director.

JOUR 215/COMM 215 Interviewing: Principles and Practice
Credits 3.3 Lecture Hours.
s. Theory and practice of methods in selected interview settings; emphasis on communication between two persons, questioning techniques, and the logical and psychological bases of interpersonal persuasion.

JOUR 230/COMM 230 Communication Technology Skills
Credits 3.3 Lecture Hours.
Introduction to interactive media and media literacy skills in the digital domain; survey of technology histories, standards, and markets for industries such as multichannel TV, digital radio, video games, streaming media, e-publishing, teleconferencing, and social networking.
Prerequisites: Communication or telecommunication media studies majors.
Cross Listing: COMM 230/JOUR 230.

JOUR 250/COMM 250 New Media and the Independent Voice
Credits 3.3 Lecture Hours.
Examination of new media as independent voices for cultural and political movements; principles governing the design, presentation, and evaluation of blogs as a persuasive medium in society.
Cross Listing: COMM 250/JOUR 250.

JOUR 285 Directed Studies
Credits 0 to 3.0 to 3 Other Hours.
Research problems related to communication field. Individual work, fitted to special needs of specific student as determined by his or her interests and aptitude.
Prerequisites: Enrollment restricted to students completing the journalism minor and approval of the program director.

JOUR 289 Special Topics in...
Credits 3.3 Other Hours.
Selected topics in an identified area of journalism and mass communication. May be repeated for credit.
Prerequisites: Enrollment restricted to students completing the journalism minor and approval of the program director.

JOUR 291 Research
Credits 0 to 3.0 to 3 Other Hours.
Research conducted under the direction of a chosen faculty member in Journalism Studies. May be taken for a maximum of 3 hours credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

JOUR 301/COMM 307 Mass Communication, Law and Society
Credits 3.3 Lecture Hours.
Mass media as social institutions; social responsibility and ethics of the press; history, constitutional development, and law of the First Amendment.
Prerequisites: JOUR 102 and JOUR 200, junior or senior classification and enrollment in journalism minor; or approval of program director.
Cross Listing: COMM 307/JOUR 301.
JOUR 303 Media Writing II  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Interpretative news gathering and writing for various media; basic communication law and ethics; assigned practice on campus or other publications.  
**Prerequisites:** JOUR 203, junior or senior classification and enrollment in journalism minor; or approval of program director.

JOUR 304 Editing for the Mass Media  
Credits 3. 3 Lecture Hours.  
Principles and practice of editing including: improving and tightening text; writing headlines, titles and subheads; self-editing and editing others; tailoring texts for specific audiences; understanding style guides.  
**Prerequisite:** Junior or senior classification or approval of program director.

JOUR 365/COMM 365 International Communication  
Credits 3. 3 Lecture Hours.  
Mass media, international, and cross-cultural audiences, theoretical, pragmatic, political and ethical issues; including cultural differences, comparative media systems, development, communication, patterns of world news flow, political propaganda, impact of international advertising and other issues.  
**Prerequisite:** Junior or senior classification.  
**Cross Listing:** COMM 365/JOUR 365.

JOUR 450 Political Reporting  
Credits 3. 3 Lecture Hours.  
Interviewing, reporting; and writing various types of political stories and commentary; exploration of ethical principles and issues in political reporting including role of free press in a democracy.  
**Prerequisite:** Junior or senior classification or approval of instructor.

JOUR 451 Arts & Entertainment Journalism  
Credits 3. 3 Lecture Hours.  
Arts & Entertainment Journalism. Journalistic coverage of arts and entertainment issues and events; examination of reviews and feature stories; feature writing and criticism; extensive workshop experience; emphasis on the value of research, self-editing and revision.  
**Prerequisite:** Junior or senior classification or approval of instructor.

JOUR 455 Literary Nonfiction  
Credits 3. 3 Lecture Hours.  
Explores the art of writing literary nonfiction, a major trend in 21st century journalism; examines several forms of literary nonfiction, including personal essay, memoir, historical biography and modern narrative: to be written in each form; provides extensive workshop experience; emphasizes the value of critiques, self-editing and revision.  
**Prerequisite:** Junior or senior classification or approval of instructor.

JOUR 458/COMM 458 Global Media  
Credits 3. 3 Lecture Hours.  
Study of globalization through media ownership; content, flow, cultural values, political power and technological impact; implications of globalization for local economies and audiences.  
**Prerequisite:** Junior or senior classification or approval of instructor.  
**Cross Listing:** COMM 458/JOUR 458.

JOUR 468 Magazine Feature Writing  
Credits 3. 3 Lecture Hours.  
Focus on the ability to communicate through a variety of styles including traditional long-form magazine writing and profiles; critical analysis and adaptation of writing skills for the latest trends in magazine, including audio and multimedia storytelling and the advent of purely digital magazines.  
**Prerequisites:** JOUR 203; junior or senior classification, or approval of instructor; major in university studies-journalism or minor in journalism.

JOUR 484 Internship  
Credits 0 to 3. 0 to 3 Other Hours.  
Directed internship in a private firm or public agency to provide on-the-job experience appropriate to the student's degree program and career objectives. To be taken on a satisfactory/unsatisfactory basis. Maximum of 3 credits may apply toward degree.  
**Prerequisites:** Enrollment in journalism minor, completion of most other journalism courses and approval of instructor.

JOUR 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Research problems related to communication field. Individual work, fitted to special needs of specific student as determined by his or her interests and aptitude.  
**Prerequisites:** Enrollment restricted to students completing the journalism minor and approval of the program director.

JOUR 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of journalism and mass communication. May be repeated for credit.  
**Prerequisites:** Enrollment restricted to students completing the journalism minor and approval of the program director.

JOUR 490 Journalism as a Profession  
Credits 3. 3 Lecture Hours.  
Exit-level course for interdisciplinary minor in Journalism; requires students to produce publication-quality projects; includes seminars in contemporary news media issues and practices.  
**Prerequisites:** Enrollment in journalism minor, completion of most other journalism courses; or approval of the program director.

JOUR 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of a chosen faculty member in Journalism Studies. May be taken for a maximum of 3 hours credit.  
**Prerequisites:** Junior or senior classification and approval of instructor.

**KINE - Kinesiology (KINE)**

KINE 120 The Science of Basic Health and Fitness  
Credit 1. 1 Lecture Hour. 1 Lab Hour.  
Overview of the human body; scientific fundamentals of stress, fitness, nutrition, disease and drug use; interdisciplinary focus on wellness and longevity; integrated physical activity experiences centering on principles and applications of the scientific basis of conditioning; not open to students who have taken KINE 223.

KINE 121 Physical and Motor Fitness Assessment  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Assessment of individual physical fitness and motor ability profiles for students majoring in kinesiology.  
**Prerequisite:** Kinesiology major.
KINE 167 Visual and Performing Arts—Jazz Dance II
Credit 1. 2 Lab Hours.
(DANC 1148) Visual and Performing Arts—Jazz Dance II. Intermediate study of jazz dance; review of historical background and cultural heritage; includes several jazz styles; proper body mechanics and alignment; placement exam required on the second day of class.
Prerequisite: Beginning jazz dance or approval of instructor.

KINE 175 Gender Neutral Partnering
Credit 1. 2 Lab Hours.
Explores the fundamental principles of partnering; explores the properties of momentum, weight sharing, contact improvisation, breath, timing and trust; develops movement phrases on the principles of impromptu and partnering.
Prerequisite: DCED 172 or approval of instructor.

KINE 198 Health and Fitness Activity
Credit 1. 2 Lab Hours.
(PHED 1164, 1238) Health and Fitness Activity. Half lecture; half activity; student choice of designated fitness or strength related activities; lecture portion covers current health topics.

KINE 199 Required Physical Activity
Credit 1. 2 Lab Hours.
(DANC 1147, DANC 1145, DANC 1146, Any 1-hour PHED activity course) Required Physical Activity. Selection from a wide variety of activities designed to increase fitness and/or encourage the pursuit of lifetime activity.

KINE 201 Pilates Apparatus
Credits 2. 2 Lecture Hours.
Study of Pilates apparatus work as designed by Joseph H. Pilates; basic principles of Pilates including breathing, pelvic and ribcage placement, scapulae stabilization, head and cervical alignment; uses apparatuses such as reformer, cadillac, chair, and barrel; incorporates the use of props such as rollers, mini balls, physioballs, blocks, therabands and pinky balls into apparatus work. May be taken 2 times for credit.
Prerequisites: KINE 198–Pilates Mat I; dance science track majors only or approval of instructor.

KINE 210 The Art of Movement
Credits 3. 3 Lecture Hours.
Introductory course that examines and appreciates movement as expressed by every culture; movement is a function driven by context, whether practical or artistic; this course examines how dance is used to advance personal, social expression via design, patterning, connoted meaning, and inter-connectivity of form; in-class discussions, applications, and presentations, students attend and critique off-campus dance productions to enhance perspective, experience and appreciation of dance movement.

KINE 213 Foundations of Kinesiology
Credits 3. 3 Lecture Hours.

KINE 214/HLTH 214 Health and Physical Activity for Children
Credits 3. 3 Lecture Hours.
(PHED 1331) Health and Physical Activity for Children. Coordinated school health and physical activity programs appropriate for elementary aged children; focus on the content of the curriculum and the philosophical underpinnings of programming related to health and physical activity.
Prerequisite: KINE 198.
Cross Listing: HLTH 214/KINE 214.

KINE 215 Fundamentals of Coaching
Credit 1. 1 Lecture Hour.
(PHED 1321) Fundamentals of Coaching. Study modern theories and applications related to coaching; philosophies, styles, techniques, team organization, liability and administration.
Prerequisite: Kinesiology majors and coaching minors only.

KINE 223 Introduction to the Science of Health and Fitness
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Overview of the human body systems; interdisciplinary focus on wellness, fitness, nutrition, disease, drug use; integrated physical activity centering on principles and applications of conditioning; collect data, evaluate information, formulate plans based on findings; experience with pedometers, heart rate monitors, bioelectrical impedance devices, software and other technology.

KINE 240/HLTH 240 Computer Technology in Health and Kinesiology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of current technology in the areas of health and kinesiology; fundamentals of computers and their use; application of commercial software to health and kinesiology settings; use of computer networks for communications and research.
Prerequisite: Freshman or sophomore classification in health or kinesiology.
Cross Listing: HLTH 240/KINE 240.

KINE 260 Movement Lab: Ballet I
Credits 2. 0 Lecture Hours. 5 Lab Hours.
Understand body alignment through ballet technique; assess individual muscular and skeletal imbalances during a ballet technique class; video references of proper body alignment, anatomical explanation and assessment of individual's use of lateral rotation in ballet technique. May be taken 3 times for credit.
Prerequisites: DCED 160; dance science majors, dance concentration majors and dance minors; or approval of instructor.

KINE 271 Movement Lab: Modern Dance I
Credits 2. 0 Lecture Hours. 5 Lab Hours.
Understand body alignment through modern dance; assess individual muscular and skeletal body imbalances during a modern dance class; introduction of how to work with imbalances in the body while executing proper dance technique; understand the structural and muscular alignment of parallel versus lateral rotation. May be taken 3 times for credit.
Prerequisites: DCED 171; dance science majors, dance concentration majors and dance minors; or approval of instructor.

KINE 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Work on a specified topic with the intent of promoting independent reading, research and study; supplement existing course offerings or subjects not presently covered.
Prerequisites: Freshman or sophomore classification; approval of instructor.

KINE 289 Special Topics in...
Credits 0 to 4. 0 to 4 Lecture Hours.
Selected topics in an identified area of kinesiology. May be repeated for credit.

KINE 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in kinesiology. May be repeated 4 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.
KINE 302 Applied Exercise Physiology for Coaches  
Credit 1. 1 Lecture Hour.  
Survey of the physiology of exercise with an emphasis on topics in applied physiology that coaches should understand in working with student athletes of both genders and different ages.  
Prerequisites: KINE 306; junior or senior classification or approval of instructor.

KINE 306 Functional Anatomy for Coaches  
Credit 1. 2 Lab Hours.  
Introduction to musculoskeletal anatomy and movement analysis and the applications of these topics to basic sport skills.  
Prerequisite: Junior or senior classification or approval of instructor.

KINE 307 Lifespan Motor Development  
Credits 3. 3 Lecture Hours.  
Developmental characteristics and contemporary issues associated with motor behavior across the lifespan.  
Prerequisite: Junior or senior classification or approval of instructor.

KINE 308 Integrated Adventure Education  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Philosophy of outdoor education in a physical education program; designing and implementing outdoor adventure activities in an experiential and interdisciplinary manner for reinforcing the Texas Essential Knowledge and Skills.  
Prerequisites: Junior or senior classification or instructor approval.

KINE 311 Fundamental Rhythms and Dance  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Theory and practice in fundamental rhythms and dance as appropriate for elementary and secondary school curricula.  
Prerequisite: Approval of instructor.

KINE 312 Coaching of Baseball  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Theory and practice of coaching fundamentals in baseball.  
Prerequisite: KINE 215.

KINE 314 Coaching of Soccer  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Study of modern theories and applications related to coaching soccer.  
Prerequisites: KINE 215 and KINE 199-Soccer or approval of instructor.

KINE 317 Coaching of Football  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Theory and practice of coaching fundamentals in football.  
Prerequisite: KINE 215.

KINE 318 Athletic Injuries  
Credits 3. 3 Lecture Hours.  
Introduction to the profession of athletic training; comprehensive analysis of the theories and practices in preventing, recognizing and treating common athletic injuries.  
Prerequisites: HLT 216; BIOL 319; BIOL 320; junior or senior classification.

KINE 320 Advanced Athletic Injuries  
Credits 3. 3 Lecture Hours.  
Principles and procedures of therapeutic modalities, therapeutic exercise and rehabilitation as they relate to physical education, athletic training and physical therapy.  
Prerequisites: KINE 318 and approval of instructor.

KINE 321 Coaching of Volleyball  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Coaching fundamentals in volleyball.  
Prerequisites: KINE 215 and KINE 199-Volleyball or approval of instructor.

KINE 324 Career Development in Coaching and Youth Development  
Credits 3. 3 Lecture Hours.  
Topic relevant to and career options in the coaching profession; preparation of future coaches and youth development professionals for successful careers; exploration and development of skills and knowledge to lead and manage individuals and teams.  
Prerequisites: Junior or senior classification; approval of instructor.

KINE 351 Coaching of Basketball  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Theory of fundamental skills needed to coach basketball with emphasis on knowledge of rules, strategies and skill analysis.  
Prerequisites: KINE 215 and KINE 199-Basketball or approval of instructor.

KINE 355 Coaching of Track  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Theory and practice of coaching fundamentals in track and field events.  
Prerequisite: KINE 215.

KINE 361 Movement Lab: Ballet II  
Credits 2. 0 Lecture Hours. 5 Lab Hours.  
Self evaluation of correct body alignment and imbalances while executing proper ballet technique; observation and assessment of the student’s progression throughout the semester in regards to proper alignment and technique. May be taken 3 times for credit.  
Prerequisite: DCED 161; dance science majors, dance concentration majors and dance minors; or approval of instructor.

KINE 372 Movement Lab: Modern Dance II  
Credits 2. 0 Lecture Hours. 5 Lab Hours.  
Self evaluation of correct body alignment and imbalances while executing proper modern dance technique; observation and assessment of the student’s progression throughout the semester in regards to proper alignment and technique. May be taken 3 times for credit.  
Prerequisite: DCED 172; dance science majors, dance concentration majors and dance minors; or approval of instructor.

KINE 386 Sport Physiology  
Credits 3. 3 Lecture Hours.  
Scientific physiological principles as they relate to sport and exercise in the preparation of current and future coaches; emphasis on cognitive, physiological knowledge and practical applications necessary to earn a creditable national certification; safely and effectively train athletic, fitness and general populations.  
Prerequisites: KINE 121, KINE 213 and KINE 302; junior or senior classification.
KINE 403 Dance Wellness  
Credits 3. 3 Lecture Hours.  
Using scientific methods to evaluate the dancer’s body; implementation of dance screening process and creation of programs to address specific dance related injuries, imbalances or misalignments; study of current research in dance medicine/science and application of this knowledge to increase longevity of movement.  
Prerequisites: BIOL 319, BIOL 320; dance science track majors only; admittance into the professional phase or approval of instructor; junior or senior classification.

KINE 404 Coaching Psychology  
Credits 3. 3 Lecture Hours.  
Mental aspects of coaching for performance improvement in athletic and exercise settings; focus on coaching applications of theoretical concepts including individual differences, motivation, team and group dynamics, leadership, performance enhancement, positive and negative health behaviors and youth development.  
Prerequisite: Junior or senior classification, or approval of instructor.

KINE 406 Motor Learning and Skill Performance  
Credits 3. 3 Lecture Hours.  
Learning in psychomotor domain; motor learning theories, physiological bases of skill behavior, motor and skill learning, state of performer and application of instructional techniques in motor learning and skill performance.  
Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-kinesiology majors.

KINE 425 Tests and Measurements  
Credits 3. 3 Lecture Hours.  
Comprehensive examination of the conceptual and theoretical aspects of measurement and evaluation in the field of kinesiology; emphasis on the application of statistical techniques germane to measurement and evaluation.  
Prerequisites: Junior or senior classification; or approval of instructor for non-majors.

KINE 426 Exercise Biomechanics  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
An integrated, mechanistic study of biomechanics of human motion during physical activity and exercise; biology and mechanical properties of the human movement system including bones, tendons, ligaments, cartilage, skeletal muscles, joints and whole body systems investigated.  
Prerequisites: PHYS 201, BIOL 319, BIOL 320; junior or senior classification; admission to the professional phase of program or approval of instructor for non-majors.

KINE 427 Therapeutic Principles  
Credits 3. 3 Lecture Hours.  
Examination of human tissue types, characteristics, and physiology pertaining to injury, pain transmission, and the healing process; study of common therapeutic modalities such as ultrasound and electricity with emphasis on physiological mechanisms of effect.  
Prerequisites: Junior or senior classification; admission to the professional phase of program or approval of instructor for non-kinesiology majors.

KINE 429 Adapted Physical Activity  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Kinesiology for individuals with handicapping conditions; emphasis on cognitive recognition of such handicaps as postural deviations, emotional disturbances, convulsive disorders, vision and auditory problems, and other learning disability conditions.  
Prerequisite: Admission to professional phase of program or approval of instructor for non-majors.

KINE 431 Ropes Course and Group Process  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Techniques of group facilitation for initiatives of ropes/challenge course events; activity presentation and sequencing, safety techniques and construction principles, and processing experiences for transfer of learning.  
Prerequisite: Junior or senior classification; approval of instructor.

KINE 433 Physiology of Exercise  
Credits 3. 3 Lecture Hours.  
Physiological bases of exercise and physical conditioning; measurement of metabolic efficiency during exercise, neuromuscular efficiency and body composition.  
Prerequisites: BIOL 319, BIOL 320, junior or senior classification; admission to the professional phase of program or approval of instructor for non-majors.

KINE 434 Advanced Exercise Physiology  
Credits 3. 3 Lecture Hours.  
Investigates mechanisms responsible for skeletal muscle power production during exercise and the energetic support for the muscles through intermediary metabolism and oxygen flux from the lungs to the muscle mitochondria; examines the effects of training on these processes.  
Prerequisites: KINE 433; junior or senior classification.

KINE 439 Exercise Evaluation and Prescription  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Prerequisites: KINE 433; senior classification; admission to the professional phase of program or approval of instructor for non-kinesiology majors.

KINE 462 Movement Lab: Ballet III  
Credits 2. 0 Lecture Hours. 5 Lab Hours.  
Peer evaluation of body alignment, imbalances and biomechanics of movement; explanation of kinesthetic principles and injury prevention through ballet technique; conditioning programs for a peer’s imbalances and improper technique in a ballet class. May be taken 3 times for credit.  
Prerequisites: DCED 162; dance science majors, dance concentration majors and dance minors; or approval of instructor.

KINE 473 Movement Lab: Modern Dance III  
Credits 2. 0 Lecture Hours. 5 Lab Hours.  
Peer evaluation of body alignment, imbalances and biomechanics of movement; explanation of kinesthetic principles and injury prevention through modern dance technique; develop conditioning program for a peer’s imbalances and improper technique in a modern dance class. May be taken 3 times for credit.  
Prerequisites: DCED 173; dance science majors, dance concentration majors and dance minors; or approval of instructor.
KINE 482 Seminar  
Credit 1. 1 Lecture Hour.  
Acquaint students with current research and the research process in their chosen field of study (kinesiology). May be taken four times for credit. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisites: Admission to professional phase of program or approval of instructor; junior or senior classification.

KINE 483 Practicum in Kinesiology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Participation and study in the areas of fitness assessment, exercise and/or sport programming and fitness/sport administration; acquisition and practice of professional and/or clinical skills in kinesiology.  
Prerequisites: KINE 199 (Aerobic Movement); senior classification; admission to the professional phase; approval of instructor.

KINE 484 Internship in Kinesiology  
Credits 0 to 12. 0 to 12 Other Hours.  
Supervised internship with corporate fitness centers, rehabilitation centers, hospitals, recreation centers and similar agencies and organizations.  
Prerequisites: KINE 483; completion of all coursework.

KINE 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Special problems in kinesiology assigned to individual students or to groups.  
Prerequisites: Junior or senior classification; approval of instructor.

KINE 489 Special Topics in...  
Credits 0 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of kinesiology. May be repeated for credit.

KINE 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in kinesiology. May be repeated 4 times for credit.  
Prerequisites: Junior or senior classification and approval of instructor.

KNFB - Kinesiology Field Based (KNFB)  
KNFB 222/HEFB 222 Teaching and Schooling in Modern Society  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Developing an understanding of students in multiple settings and levels; development, structure, history, finance, and management of schools in a democratic society; philosophical, ethical and moral dimensions of teaching; professional role of teacher.  
Prerequisite: Majors only; junior or senior classification.  
Cross Listing: HEB 222/KNFB 222.

KNFB 315 Elementary School Physical Activities  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Physical activities, materials and curriculum in elementary schools.  
Prerequisite: Junior or senior classification; admission to the professional phase of program.

KNFB 324/HEFB 324 Technology and Teaching Skills for the 21st Century Learner  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Preparation of future Health and Physical Education teachers with practical skills related to: technology in the classroom/gymnasium, strategies for addressing urban education and English language learners, liability, management and classroom discipline, development of professional communication skills and time management; includes field based experiences in diverse classroom settings.  
Prerequisites: HEBF 222/KNFB 222 or KNFB 222/HEBF 222; admission to professional phase of program.  
Cross Listing: HEBF 324/KNFB 324.

KNFB 325/HEFB 325 Introduction to Secondary School Teaching  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Introduce fundamental teaching skills and theories necessary for preparing reflective teachers; examine classroom management, learning strategies and assessment techniques; classroom lectures combined with field-based experiences to link theory into practice.  
Prerequisites: HEBF 222/KNFB 222 or KNFB 222/HEBF 222; admission to professional phase of program; junior or senior classification.  
Cross Listing: HEBF 325/KNFB 325.

KNFB 416 Middle and Secondary School Physical Activities  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Physical activities, teaching strategies, media techniques and curriculum in middle and secondary schools.  
Prerequisites: Admission to professional phase of program; approved acceptance to field experience.

KNFB 450/HEFB 450 Supervised Student Teaching  
Credits 6. 6 Other Hours.  
Observation and participation in an accredited public school classroom; techniques of teaching student's teaching fields, and appropriate instructional strategies for assigned student population.  
Prerequisites: Admission to professional phase of program and to student teaching.  
Cross Listing: HEBF 450/KNFB 450.

LAND - Landscape Architecture (LAND)  
LAND 101 Introduction to Landscape Architectural Practice  
Credit 1. 1 Lecture Hour.  
Explores and evaluates the diversity of landscape architectural practice; defines the traditional practice forms and examines evolving and boundary expanding opportunities for future practice; introduces the departmental curriculum and faculty.

LAND 111 Landscape Architecture Communications I  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
Introduction to basic drafting and drawing required for landscape architecture projects, introduction to basic concepts, principles of graphic composition and pencil sketching techniques.

LAND 112 Landscape Architectural Communications II  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
Advanced study in traditional and computer-based communication techniques in landscape architecture including studio explorations in concept and analysis graphics, color sketching, perspective drawing and rendering, desktop publishing, image capturing and manipulation, and compilation of graphic presentations; lecture, demonstrations and studio assignments.  
Prerequisite: LAND 111 or approval of instructor.
LAND 211 Landscape Design I
Credits 4. 2 Lecture Hours. 7 Lab Hours.
Beginning studio course in land design; forces that produce usable three-dimensional site-space relationships; problems presented to give a basic knowledge, scope and application of landscape architecture design principles. Overnight field trip required.
Prerequisites: LAND 112; junior or senior classification or approval of instructor.

LAND 212 Landscape Design II
Credits 4. 2 Lecture Hours. 7 Lab Hours.
Continuation of LAND 318; basic design principles that combine natural systems (such as landform, water, vegetation, wildlife habitat, soils, climate) and human-built systems (such as roads, building utilities).
Prerequisites: LAND 211 and LAND 231.

LAND 231 Landscape Construction I
Credits 4. 2 Lecture Hours. 4 Lab Hours.
First construction studio course; aspects of site engineering and consideration of earth bound elements in land development; contours, landform, grading design, drainage principles, cut and fill computations, basic hydraulics and hydrology, stormwater management.
Prerequisite: Junior or senior classification or approval of instructor.

LAND 232 Landscape Construction II
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Second construction studio course; essential construction materials and systems applied in landscape development; topics include statics and mechanics of simple structures; properties and procedures of wood, masonry and concrete construction; construction sequencing and material costs; development of a construction document package.
Prerequisites: LAND 211 and LAND 231; junior or senior classification.

LAND 240 History of Landscape Architecture
Credits 3. 3 Lecture Hours.
Introduction to history of land use, urban design and planning, and site design from prehistory to the present in Europe, Asia, Africa and Australia; contemporary issues in landscape architecture such as sustainability, ecological design, and professional roles, both historically and at present, with comparisons to American examples.
Prerequisite: Sophomore classification or higher.

LAND 241 History and Development of Landscape Architecture in North America
Credits 3. 3 Lecture Hours.
Interaction between people and the land in North America from first settlement to the present; settlement patterns, sustainable land use, urban design and plan, and site design in context of cultural, social, and technological factors; current issues in landscape architecture, landscape urbanism, and land-use planning.

LAND 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in landscape architecture. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

LAND 301 Landscape Architecture Theory
Credits 3. 3 Lecture Hours.
Landscape Architecture. Relevant theoretical discourse in landscape architecture, urban planning and urban design; urban theory, social and cultural theory; critical and creative thinking; ecological planning and design; process and sustainable development; environmental philosophy and environmental aesthetics.
Prerequisite: Junior classification or approval of instructor.

LAND 311 Landscape Design III
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Design process; sustainable landscape design, synthesis and design refinement; problems to stimulate highly creative self-motivated results, design thinking to integrate behavioral settings into natural and/or built landscape systems.
Prerequisites: LAND 212 and LAND 232; junior or senior classification.

LAND 312 Landscape Design IV
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Continuation of LAND 311; land design projects of increased complexity and emphasis on sustainability, with site scale problems used to demonstrate complete design thought. One or more field trips may be required.
Prerequisite: LAND 311.

LAND 331 Landscape Construction III
Credits 4. 2 Lecture Hours. 4 Lab Hours.
Third construction studio course; sustainable water management techniques in landscape development; theory, principles and techniques of low impact development; construction document preparation, working drawings, project layout and design; theory and principles of irrigation and lighting design. Field trips required.
Prerequisites: LAND 320 and LAND 330; junior or senior classification.

LAND 412 Landscape Design VI
Credits 5. 2 Lecture Hours. 9 Lab Hours.
Capstone studio; advanced study and research designed to go beyond the core design experience; introduction of issues, methodologies, tools and techniques developing in professional practice.
Prerequisite: LAND 312.

LAND 431 Professional Practice
Credits 3. 3 Lecture Hours.
Procedures, management and ethical frameworks in which professional landscape architectural practice occurs; topics include forms of practice, employment, proposal preparation, fee and contract structures, project management, roles of the landscape architect, presentations and public participation, legal and ethical responsibilities.
Prerequisites: Senior classification; approval of instructor.

LAND 484 Summer Internship
Credits 0. 0 Lecture Hours.
Practical experience in an office of design allied professionals; 10 week internship with a minimum of 400 hours; continuous employment; departmental pre-approval through the department internship coordinator required. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Upper level classification and approval of internship coordinator, LAND 321.

LAND 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Special problems in various phases of landscape architecture assigned to individual students or to groups. Consultation and assigned collateral reading.
Prerequisite: Approval of department head.
LAND 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified field of landscape architecture. May be repeated for credit.

LAND 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in landscape architecture. May be repeated 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

LBAR 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of liberal arts. May be repeated for credit.
Prerequisite: Freshman or sophomore classification in liberal arts or approval of instructor.

LBAR 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in Liberal Arts.
Prerequisites: 3 hours of 200-level courses in any department in the College of Liberal Arts; freshman or sophomore classification and approval of instructor.

LBAR 300 Liberal Arts Study Abroad
Credits 1 to 18. 1 to 18 Other Hours.
For students in approved programs abroad. May be repeated for credit.
Prerequisites: Admission to approved program; approval of study abroad coordinator and academic dean.

LBAR 330 Introduction to International Study
Credits 1 to 3. 1 to 3 Lecture Hours.
Readings and research preparatory to participation in a summer or semester at an international site.
Prerequisite: Approval of the dean of liberal arts.

LBAR 331 Studies in European Civilization and Culture I
Credits 1 to 6. 1 to 6 Lecture Hours.
European civilization and culture as seen especially through literature, history, philosophy and the arts. To be taught only at an overseas site.
Prerequisite: LBAR 330 or approval of instructor.

LBAR 332 Studies in European Civilization and Culture II
Credits 1 to 6. 1 to 6 Lecture Hours.
European civilization and culture as seen especially through political, social and economic developments. To be taught only at an overseas site.
Prerequisite: LBAR 330 or approval of instructor.

LBAR 392 Cooperative Education: Liberal Arts
Credit 1. 1 Other Hour.
Educational work assignment for a student in a career-related field; supervision by the employer, co-op coordinator and course instructor; technical report approved by the course instructor required. To be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Approval of college co-op coordinator.

LBAR 400 Topics in Liberal Arts II
Credits 3. 3 Lecture Hours.
Emphasis on developed critical thinking, international perspectives and scholarly research; capstone course in the Liberal Arts Cornerstone Program Honors Learning Community. May be taken 3 times for credit as topics will vary each semester.
Prerequisites: LBAR 200 and admission to College of Liberal Arts Cornerstone Learning Program Community.

LBAR 484 Internship
Credits 0 to 12. 0 to 12 Other Hours.
Directed internship in a private firm, government or non-profit agency; provides experiential learning appropriate to the student's major and career objectives. Must be taken on a satisfactory/unsatisfactory basis. May be taken a maximum of 12 hours for credit.
Prerequisites: Junior or senior classification and approval of major advisor.

LBAR 485 Directed Studies
Credits 0 to 3. 0 to 3 Lecture Hours. 0 to 3 Other Hours.
Readings for specific needs of major or minor in departments in Liberal Arts.
LBAR 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of liberal arts. May be repeated for credit.

LBAR 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in Liberal Arts. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of dean of college.

LDEV - Land Development (LDEV)

LDEV 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Individual instruction in selected aspects of land development not adequately covered by other courses with stress on reports and readings in selected areas of land development.
Prerequisite: Junior classification or approval of instructor.

LDEV 489 Special Topics in...
Credits 1 to 6. 1 to 6 Lecture Hours.
Selected topics in an identified area of land and real estate development. May be repeated for credit.
Prerequisite: Junior classification or approval of instructor.

LING - Linguistics (LING)

LING 209/ENGL 209 Introduction to Linguistics
Credits 3. 3 Lecture Hours.
Nature of human language and of linguistics; includes an introduction to phonology, syntax, semantics and morphology and the role of spoken and written discourse in sustaining societal arrangements.
Cross Listing: ENGL 209/LING 209. Credit cannot be given for both LING 209/ENGL 209 and ENGL 209/LING 209.

LING 291 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in linguistics.
Prerequisites: LING 209/ENGL 209; freshman or sophomore classification and approval of instructor.

LING 307 Language and Culture
Credits 3. 3 Lecture Hours.
Language and its correlations with other aspects of culture; nature and definition of language; non-technical overview of linguistic science and language as it is related to other behavior.
Prerequisite: Junior or senior classification.

LING 310/ENGL 310 History of the English Language
Credits 3. 3 Lecture Hours.
Phonological, grammatical and lexical history of the English language; brief discussion of some other Indo-European languages; principles of linguistic change, as reflected in English.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 310/LING 310.

LING 403 Language and Gender
Credits 3. 3 Lecture Hours.
Language and gender from a sociolinguistic perspective; gender in the words and structures of language; gender representation and gendered language use in the media, and a variety of sociocultural contexts; language use in intimate relationships; computer-mediated discourse; language, sexuality, and sexual orientation.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 403 and WGST 403.

LING 481 Senior Seminar
Credits 3. 3 Lecture Hours.
Seminar on significant figures, movements and issues in linguistics or rhetoric, with special attention to the methods and materials of scholarship.
Prerequisites: Junior or senior classification; 6 credits in linguistics.

LING 485 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Directed individual study of topics in linguistics. May be repeated for credit.

LING 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of linguistics. May be repeated for credit.

LING 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in linguistics. May be repeated 2 times for credit.
Prerequisites: 6 credits of linguistics; junior or senior classification and approval of instructor.

LMAS - Latino/Mex Amer Studies (LMAS)

LMAS 201 Introduction to Latino/Mexican American Studies
Credits 3. 3 Lecture Hours.
Introductory survey of the historical presence of U.S. Latinos and Mexican Americans from an interdisciplinary perspective that incorporates the group's global origins; application of critical thinking skills to the study of Latinos and Mexican Americans.

MARA - Maritime Administration (MARA)

MARA 205 Introduction to Ships and Shipping
Credits 3. 3 Lecture Hours. 0 Lab Hours.
Introduction to the maritime industry and ships used in transportation of goods and services. Shipboard nomenclature, types and missions of merchant ships, shipbuilding nomenclature and dimensions, shipbuilding materials and methods, modes of cargo handling and their impact on ship design.

MARA 212 Business Law
Credits 3. 3 Lecture Hours.
Legal principles of business, legal reasoning, dispute resolution and procedure, contract law, bankruptcy law, property law, Uniform Commercial Code sections concerning contracts, security interests, negotiable instruments and sales.
Prerequisite: Sophomore classification.
MARA 250 Management Information Systems  
Credits 2. 2 Lecture Hours.  
Introduction to the concepts and applications of management information systems, including information technology concepts, computer hardware, common business software, software selection and development, management information systems (MIS), decision support systems (DSS), and working in a digital world.

MARA 281 Seminar in Undergraduate Research Methods  
Credit 1. 1 Lecture Hour.  
An introduction to necessary undergraduate research methods in economics and business, to prepare students for investigative writing requirements in upper division courses in maritime business administration.  
Prerequisite: Sophomore standing.

MARA 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Directed study on selected problems in the area of maritime administration not covered in other courses.  
Prerequisite: Approval of MARA department head.

MARA 289 Special Topics  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Study of selected topics in an identified area of maritime administration.  
Prerequisite: Approval of MARA department head.

MARA 301 Ocean Transportation I  
Credits 3. 3 Lecture Hours.  
Examination of theory and practice in the management of transportation logistics, labor, rate-making, role of government, international conventions and treaties. Exposure to current trends and developments in shipping.  
Prerequisites: MART Students - MART 103, ECON 202 or ECON 203. MARA students - MARA 205, ECON 202 or ECON 203.

MARA 304 Ocean Transportation II  
Credits 3. 3 Lecture Hours.  
Marine insurance problems and cases and how they relate directly to a ship’s officer. Hull, cargo, and personal injury cases are examined from the officers’ and insurers’ points of view. Introduction to Admiralty Law and the court process for seamen’s rights and ship owners’ privileges. Actual hearings and trials are observed to complete the background.  
Prerequisite for MART and MARA students: MARA 301.

MARA 342 Managerial Maritime Finance  
Credits 3. 3 Lecture Hours.  
Continuation of topics introduced in Business Finance (FINC 341) including risk and return, investment valuation, the selection of risky investment projects, capital structure, dividend policy, and methods of raising long-term capital; applications to the maritime industry are made where appropriate.  
Prerequisite: FINC 341.

MARA 363 The Management Process  
Credits 3. 3 Lecture Hours.  
Management as an academic discipline; goal setting; planning, controlling and decision-making; models for thinking about organizations; organization design; organization change; models for understanding individual behavior; job performance and job satisfaction; interpersonal behavior, motivation and leadership, behavior in work groups; careers in management, ethics and international management.  
Prerequisite: Junior or senior classification.

MARA 373 Personnel Management  
Credits 3. 3 Lecture Hours.  
Human Resource Management. Strategic issues in managing human resources; shared responsibilities of line managers and human resource staff for developing and implementing human resource policies and procedures; human resource planning; job design, analysis and evaluation; staffing; compensation; performance appraisal; training and development career management; labor relations; legal, ethical and international issues.  
Prerequisite: MARA 363.

MARA 401 Brokerage and Chartering  
Credits 3. 3 Lecture Hours.  
Operational and legal environment of ship brokerage and chartering; responsibilities of owner and charterer under various charter forms; American, British and Canadian acts governing charters and bills of lading; rules and regulations concerning loading and discharging.  
Prerequisites: MARA 205, MARA 301. Senior classification.

MARA 402 Inland Waterways  
Credits 3. 3 Lecture Hours.  
Development of inland waterways of the U.S. and federal policies relating to them. Port and terminal development, competition with other transportation forms, manpower, rates, environmental concerns and the impact of waterway systems on regional economies.  
Prerequisites: ECON 203. Senior classification.

MARA 416 Port Operations, Administration and Economics  
Credits 3. 3 Lecture Hours.  
Concepts of the port and methods of intermodal transfer. Port functions divided and analyzed along business lines: economics, management, finance, accounting, and marketing. Cost studies.  
Prerequisites: MARA 301. Junior or senior classification.

MARA 421 Admiralty Law  
Credits 3. 3 Lecture Hours.  
Essential principles of admiralty, general maritime, and international law as applicable to the marine industry and ocean shipping. Evolution and state of the law concerning maritime liens, ship mortgages, rights of seamen and harbor workers, limitation of liability, bills of lading and cargo carriage, collision liability, general average, marine salvage, charter parties, and international rights and responsibilities of ships and shipping.  
Prerequisites: MARA 301, MARA 304.

MARA 424 Economics of Transportation  
Credits 3. 3 Lecture Hours.  
Historical development, structure, function, and regulation of highway, rail, water, pipeline, and air transportation systems. Application of economic concepts and principles to transportation development and operations.  
Prerequisites: ECON 203 and senior classification.

MARA 435 Labor Law and Policy  
Credits 3. 3 Lecture Hours.  
Federal and state public policy and laws regulating human resource management including National Labor Relations Act, Railway Labor Act, Fair Labor Standards Act, employment discrimination statutes, statutes regarding public sector unionization, and other relevant legal authorities; various forms of dispute settlement including litigation, mediation, fact finding and arbitration; legal ramifications of strategic human resource management decision making.  
Prerequisites: MARA 212; junior or senior classification.
MARA 440 Global Economy and Enterprise Management
Credits 3. 3 Lecture Hours.
Global Economy and Enterprise Management. Introduction to the economic, political, social and ethical environments of international business including the determinants of trade and investment patterns and the logic of government interventions in both trade and capital markets; also discussed are the structure, strategy and operations of the international firm.
Prerequisites: ECON 203, MARA 281 and junior or senior classification.

MARA 450 Maritime Supply Chain Management
Credits 3. 3 Lecture Hours.
Introduction to the concepts involved in supply chain management (SCM); SCM encompasses the functional areas of procurement, operations management, inbound/outbound transportation, customer service, and information technologies; emphasizes how these functional areas are integrated to achieve the firm's overall objectives.
Prerequisites: SCMT 303 and SCMT 364.

MARA 460 Management Systems and Control
Credits 3. 3 Lecture Hours.
Application of management processes to complex interdisciplinary organizational environments through the study of program and project management. Adoptions of traditional management theories to the project environment. Student will be expected to master typical project management microcomputer software for project planning; resource allocation; project budgeting; and control of project cost, schedule and performance.
Prerequisites: SCMT 364, MARA 363. Junior classification.

MARA 466 Strategic Management
Credits 3. 3 Lecture Hours.
Strategic issues facing organizations, including top management decision making and social responsibility; environmental and industry analysis; establishing organizational mission and objectives; corporate, business and functional level strategy formulation; global and multidomestic strategies; strategic implementation and control; integrating operations, finance, marketing and human resource strategies; case analysis.
Prerequisites: MARA 281, MARA 363, MKTG 321, SCMT 364, FINC 341, and senior classification.

MARA 470 Environmental Law
Credits 3. 3 Lecture Hours.
Designed to provide a broad background of basic statutes, regulations, and cases dealing with the major issues in international and federal environmental law. Specifically, the course will focus on pragmatic training in statutory, regulatory, and treaty reading and interpretation; analysis of administrative and legislative intent for law.
Prerequisites: MARA 212, MARA 421. Senior classification.

MARA 475 Business Leadership
Credits 3. 3 Lecture Hours.
Focus on theory and practice of leadership; familiarize with components, theory and models of leadership; compare/contrast styles; review leadership/followership relationship as a collaborative activity resulting in achieved goals; analyze cultural and global components and ethical issues associated with leadership.
Prerequisite: Junior or senior classification or approval of instructor.

MARA 484 Management Internship
Credits 0 to 4. 0 to 4 Other Hours.
Internship in management; staffing, planning, organizing, leading and controlling. Enrollment is limited to those who have managerial responsibilities for the resources used by a business, non-profit, or other organization.
Prerequisites: ACCT 229, ACCT 230, FINC 341, MKTG 321, MARA 363. Approval of department head.

MARA 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study on selected problems in the area of maritime administration not covered in other courses.
Prerequisites: Cumulative GPA of 2.5 or higher. Approval of instructor and MARA department head.

MARA 489 Special Topics
Credits 1 to 4. 1 to 4 Lecture Hours.
Study of selected topics in an identified area of maritime administration.
Prerequisite: Approval of instructor.

MARA 491 Research In Maritime Administration
Credits 0 to 4. 0 to 4 Other Hours.
Research in Maritime Administration. Research conducted under the direction of faculty member in Maritime Administration. May be repeated 2 times for credit. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

MARA 493 International Maritime Management Experience
Credits 3. 3 Lecture Hours.
Combination of classroom and two week international travel emphasizing cultural and historic aspects of maritime industry; direct contact with managers and regulators in the international maritime industry; examination of different management styles, business practices and regulatory approaches.

MARB - Marine Biology (MARB)

MARB 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special topics and problems in field and/or laboratory work suited to analysis by individuals or small groups concerning aspects of marine biology. Usually requires a report describing techniques and results. Only 3 credit hours may be used in the degree plan curriculum.
Prerequisites: 2.25 GPR, Approval of instructor.

MARB 289 Special Topics in Marine Biology
Credits 1 to 4. 1 to 4 Lecture Hours.
Study of selected topics in an identified area of marine biology.
Prerequisite: Approval of instructor.

MARB 300 Scientific Methods in Marine Biology
Credits 2. 1 Lecture Hour. 3 Lab Hours.
An introduction to field, laboratory and analytical methods, equipment and instruments. The field portion will include making proper observations, sampling techniques, and data recording. The laboratory portion will include sample analysis methods, use of instruments, introduction to data analysis including elementary statistics, introduction to scientific literature and report writing style.
Prerequisites: BIOL 112. Curriculum sophomore, junior or senior classification or approval of instructor.
MARB 301 Genetics  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Fundamental principles of genetics; physical basis of Mendelian inheritance; expression and interaction of genes, linkage, sex linkage, biochemical nature of genetic material, and mutation.  
Prerequisites: CHEM 227, 228, 237 and 238. Curriculum junior or senior classification or approval of instructor.

MARB 302 The Sea World Experience  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Exploration of marine organisms, survey topics in vertebrate marine biology and the role that aquatic oriented parks play in education, research and conservation; hands-on experiences by participating in aspects of maintaining aquatic organisms in captivity including animal care and nutrition, physiology, behavior, animal training and water quality; exposure to marine organismal taxonomy, natural history, anatomy and ecology.  
Prerequisites: BIOL 111 with a grade of C or better; GPA greater than 2.00.

MARB 303 Biostatistics  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Introduction to sampling, experimental design, analysis of data, and testing of hypotheses, with emphasis on methods applied to biological investigations. Parametric and non-parametric techniques. Descriptive statistics, analysis of variance, correlation and regression.  
Prerequisites: MATH 151 or MATH 142; sophomore, junior or senior classification or approval of instructor.

MARB 310 Introduction to Cell Biology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Cellular structure/function; prokaryotic vs. eukaryotic cells; examination of cellular membranes and membrane transport; analysis of DNA replication, transcription, and protein translation (an extension of their treatment in MARB 301); introduction to the components and genetics of immunology.  
Prerequisites: BIOL 112, CHEM 228, MARB 301; junior or senior classification or approval of instructor. MARS 360 is recommended but not required.

MARB 311 Ichthyology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Freshwater and marine fishes. Subject will be mainly systematic, but evolution, ecology, life history, and economics of more important species will be treated.  
Prerequisites: BIOL 112 and MARB 315. Curriculum sophomore, junior or senior classification or approval of instructor.

MARB 312 Field Ichthyology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Field and laboratory studies on identification and ecology of freshwater and marine fishes of Texas. Field trips required.  
Prerequisites: MARB 311. Curriculum sophomore, junior or senior classification or approval of instructor.

MARB 315 Natural History of Vertebrates  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Natural history of fishes, amphibians, reptiles, birds, and mammals, with emphasis on coastal Texas vertebrates.  
Prerequisites: BIOL 112. Curriculum sophomore, junior or senior classification or approval of instructor.

MARB 320 Fisheries Techniques  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
An introduction to theory and techniques in fisheries biology and ecology. Experience with fisheries equipment and techniques will be provided in both field and laboratory. Practical sampling design, collection, and interpretation of data from estuarine, coastal and offshore environments will be addressed.  
Prerequisites: BIOL 112, MARB 311. Junior or senior classification or approval of instructor.

MARB 325 Biospeleology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
A field-oriented introduction to the biology of aquatic and terrestrial cave organisms with discussions on the origin of caves, cave environment, cave fauna, and evolution. Field trips required.  
Prerequisites: BIOL 112, CHEM 101. Junior or senior classification or approval of instructor.

MARB 334 Biology of Sea Turtles  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Living sea turtles of the world, with emphasis on species in the Atlantic, Gulf and Caribbean basins. Emphasis includes phylogeny, population biology, ecology, life history, behavior, social and economic aspects and their impact on sea turtle conservation and recovery.  
Prerequisites: BIOL 112, MARB 315 or instructor approval.

MARB 335 Fish Physiology  
Credits 3. 3 Lecture Hours.  
Study of the basic physiology of fishes. Examination of fish cardiovascular, renal, digestive, locomotor, reproductive, and central/peripheral nervous systems. Discussion of physiological adaptations enhancing survival in a water medium.  
Prerequisites: BIOL 112. Junior or senior classification or approval of instructor.

MARB 340 Tropical Marine Ecology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
This course provides for field-oriented experience in coral reef, mangrove, sea grass and other tropical marine ecosystems. Special emphasis will be placed on biodiversity, ecology and conservation issues specific to Yucatan Peninsula of Mexico.  
Prerequisites: BIOL 112. All students who dive must either be a current AAUS scientific diver or present a current medical examination (which will be provided by the Diving Safety Officer or instructor) completed within the past 12 months and signed by a doctor, to the instructor before class participation in the pool will be allowed. Prior to using scuba equipment, all students must provide proof of open water certification or equivalent diving experience (advanced certification recommended). Permission of the instructor and the Diving Safety Officer is required before any pool activity takes place. Divers Alert Network insurance, or equivalent, is required.
MARB 345 Introduction to Scientific Diving
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Prepare and qualify divers for entry into the TAMUG Scientific Diving Program. Students must pass medical, swimming, skin diving and scuba diving tests. Lectures include diving equipment, physics, physiology, medicine, regulations, environment, emergency and decompression procedures.
Prerequisites: BIOL 111, PHYS 201, advanced scuba certification. Junior or senior classification or approval of instructor. All students must present a current medical examination (which will be provided by the Diving Safety Officer or instructor) completed within the past 12 months, to the instructor before class participation in the pool will be allowed. Prior to using scuba equipment, all students must provide proof of basic certification. Permission of the instructor and the Diving Safety Officer is required before any pool activity takes place. Divers Alert Network insurance, or equivalent, is required.

MARB 350 Methods in Research Diving
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Survey of research methods and techniques using diving. Lecture and lab designed to train students in safe, efficient use of diving to collect and record data underwater for studies primarily in biology, geology, and archaeology.
Prerequisites: MARB 345. Junior or senior classification or approval of instructor. All students must present a completed medical examination (Appendices 1-4 in the TAMUG diving manual) signed by a doctor, to the instructor before class participation in the pool will be allowed. Prior to using scuba equipment, all students must provide proof of advanced open water certification or equivalent diving experience. Permission of the instructor and the Diving Safety Officer is required before any pool activity takes place. Divers Alert Network insurance, or equivalent, is required.

MARB 360 Marine Conservation Biology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Lectures and laboratories cover the major principles of conservation biology; a new synthetic field that applies concepts of ecology, systematics and evolution, biogeology, genetics, behavioral sciences, and social sciences to the conservation of marine fisheries resources. Lab exercises include morphometric and genetic variation, GIS, molecular systematics and phylogenetic inference.
Prerequisite: Junior or senior classification or approval of instructor.

MARB 400 Biology of Marine Mammals
Credits 4. 3 Lecture Hours. 3 Lab Hours.
A broad-spectrum course on the taxonomy, evolution, morphology behavior, and ecology of marine mammals, including sirenians, carnivores, baleen whales and dolphins.
Prerequisite: BIOL 112, MARB 315. Junior or senior classification or approval of instructor.

MARB 401 Physiological Ecology of Marine Mammals
Credits 3. 3 Lecture Hours. 0 Lab Hours.
Anatomy, taxonomy, phylogeny and physiological adaptations of marine mammals.
Prerequisites: MARB 315; junior or senior classification or approval of instructor.

MARB 403 Cetacean Behavior and Behavioral Ecology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
This course consists of lecture of up to date descriptions of Cetacean behavior and ecology; and of labs that evaluate the literature of topics of present relevance.
Prerequisite: MARB 315. Junior or senior classification or approval of instructor.
MARB 415 Coastal Marine Biology and Geology of Alaska
Credits 3. 3 Lecture Hours.
Field course conducted in south-central Alaska for two weeks; work at the remote Alice Cove Research Station located in Prince William Sound; conduct research on marine mammals behavior and ecology; exploration of the geology and glaciology.
Prerequisites: BIOL 112.

MARB 420 Comparative Animal Physiology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Principles of animal physiology are examined using invertebrate and vertebrate model systems. Topics include osmoregulation in marine vs. freshwater vs. terrestrial organisms, excretion, fluid circulation, nervous system structure and function, muscle activity, sensory neurobiology, and endocrine mediation.
Prerequisites: BIOL 112, CHEM 228, MARB 310. Junior or senior classification or approval of instructor.

MARB 423 Mariculture
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Study of factors determining the success of efforts to cultivate estuarine and marine species of economic importance. Mariculture practices used worldwide in the production of algae, mollusks, crustaceans, and fishes will be discussed.
Prerequisite: Junior or senior classification or approval of instructor.

MARB 425 Marine Ecology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Relationship between various marine environments and their inhabitants; intra- and interspecific relationships between organisms; structure and function among marine communities. Laboratory emphasis is placed on study of living material and natural habitats in the Gulf of Mexico.
Prerequisites: MARB 315; senior classification or approval of instructor.

MARB 426 Aquatic Animal Nutrition
Credits 3. 3 Lecture Hours.
Chemistry, digestion, absorption and intermediary metabolism of nutrient classes with special emphasis on their relationship to warmwater fish nutrition. Determination of nutrient requirements, feed evaluation, feed processing, ration formulation and feeding practices.
Prerequisites: CHEM 227. Junior or senior classification or approval of instructor.

MARB 430 Coastal Plant Ecology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Study of the identification, distribution, production, and ecological importance of estuarine, coastal marsh, and dune vascular plants; the interaction of plants with their abiotic and biotic environments; and techniques of vegetation management and evaluation.
Prerequisites: BIOL 112. Junior or senior classification or approval of instructor.

MARB 433 Applied Bioinformatics
Credits 3. 3 Lecture Hours.
Fundamental concepts and methods in bioinformatics using sequence analysis and practical applications; includes biological databases, sequence and structure alignments, structural bioinformatics, gene prediction and genome analysis; emphasis on understanding and application of these concepts.
Prerequisites: MARB 301; junior or senior classification or approval of instructor.

MARB 435 Marine Invertebrate Zoology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Marine Invertebrate Zoology. General biology of marine invertebrate animals; morphology, evolution, and systematics. Laboratory will stress studies of local fauna.
Prerequisites: BIOL 112. Junior or senior classification or approval of instructor.

MARB 437 Pathology of Marine Animals
Credits 3. 3 Lecture Hours.
Examination of changes or loss of physiological function as related to common diseases (viral, bacterial, parasitic) or injury; mechanisms of disease in cells, tissues and organ systems of marine vertebrates; emphasis on marine mammals; fishes and marine reptiles/birds; clinical manifestations, diagnostics and treatments.
Prerequisites: MARB 315; junior or senior classification or approval of instructor.

MARB 438 Coastal Ornithology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Coastal Ornithology. Field and laboratory studies on the identification, classification, distribution and ecology of birds with special emphasis on birds of the Texas Gulf Coast. Classroom lectures to include anatomy, physiology, behavior and migration. Field trips required.
Prerequisites: MARB 315. Junior or senior classification or approval of instructor.

MARB 445 Marine Fisheries Management
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Basic knowledge from marine ichthyology, biology of fishes and biological oceanography related to applied aspects of marine fisheries sciences. Emphasis placed on management techniques applicable to tidal-influenced inland water, estuaries, and oceans.
Prerequisite: Junior or senior classification or approval of instructor.

MARB 460 Fisheries Population Dynamics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
An introduction to the behavior of populations. Classical and recent population theories will be discussed in lecture. In lab, extant and programs written by students will be used to explore population behavior and interactions.
Prerequisites: MATH 151. Senior classification or approval of instructor.

MARB 466 Evolutionary Biology
Credits 3. 3 Lecture Hours.
A conceptual examination of evolutionary theory, not a survey of specific organismal evolutions. Evidence for the abiotic origin of life is presented, followed by a discussion of micro-evolutionary (including drift and natural selection) and macro-evolutionary (including evolutionary trends) mechanisms. The course concludes with application of these concepts to human evolution.
Prerequisites: BIOL 112. Junior or senior classification or approval of instructor. MARB 301 is recommended but not required.

MARB 482 Seminar in Marine Biology
Credit 1. 1 Lecture Hour.
Compilation of literature pertaining to topics in marine biology. Emphasis placed on preparation of a written report and presentation of a synopsis of that report.
Prerequisite: Junior or senior classification or approval of instructor.
MARB 484 Undergraduate Internship  
Credits 0 to 9. 0 to 9 Other Hours.  
Supervised study in a research or teaching laboratory remote from TAMUG. Student involvement is to consist of real-life learning or marine biological research, teaching, management, or a combination of these.  
Prerequisite: Junior or senior classification or approval of instructor.

MARB 485 Directed Studies  
Credits 1 to 6. 1 to 3 Other Hours.  
Per Semester. Special topics and problems in field and/or laboratory work suited to analysis by individuals or small groups concerning aspects of marine biology. Usually requires a report describing techniques and results. Only 3 credit hours may be used in the degree plan curriculum.  
Prerequisites: 2.25 GPR. Curriculum sophomore, junior or senior classification or approval of instructor.

MARB 489 Special Topics in Marine Biology  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Study of selected topics in an identified area of marine biology.  
Prerequisite: Junior or senior classification or approval of instructor.

MARB 491 Research in Marine Biology  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in Marine Biology. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. May be repeated for credit.  
Prerequisites: Junior or senior classification or approval of instructor.

MARE - Marine Engr Technology (MARE)

MARE 100 Marine Engineering Fundamentals  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
A study of basic marine engineering systems, with emphasis on propulsion plants. Introduction to propulsion plant machinery and shipboard safety practices and equipment; offshore oil production; subsea technologies; petroleum product transport and refinery.  
MARE 180 Basic Machine Shop Techniques  
Credit 1. 3 Lab Hours.  
Safety, care of machines and hand-tools, cutting speeds and feeds, measuring instruments, gauging, standard machine tool work in metals, layouts, drilling, tapping, threading, vertical and horizontal milling and shaving.

MARE 200 Basic Operations  
Credits 4. 4 Lecture Hours.  
Practical application of student's classroom studies while at sea on training ship during sea-training period. Student required to complete several projects relating to engineering plant of ship.  
Prerequisite: NAUT 104.

MARE 202 Marine Thermodynamics  
Credits 3. 3 Lecture Hours.  
Energy Concepts; First and second law of thermodynamics; Carnot and Rankine principles and reversible heat cycles; Properties of processes of vapors; vapor-power cycles and vapor refrigeration cycles.  
Prerequisites: MARE 100, MATH 152 or MATH 161 or concurrent enrollment.

MARE 205 Engineering Mechanics I  
Credits 3. 3 Lecture Hours.  
Statics, basic vector operations, mechanics of particles and rigid bodies. Center of gravity, analysis of structures, friction, moments of inertia.  
Prerequisites: MATH 151, PHYS 218.

MARE 206 Engineering Mechanics II  
Credits 3. 3 Lecture Hours.  
Dynamics; scalar and vector solutions of relative linear velocities and acceleration; kinetics; dynamics of translation and rotation; work; energy; impact; momentum.  
Prerequisite: MARE 205.

MARE 207 Electrical Power I  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Application of circuit analysis principles to DC and AC circuits having sources and passive inductors, resistors and capacitors; electrical instrumentation; power and voltage/current phase relationships in AC circuits; balanced three-phase AC power circuits; cable sizing.  
Prerequisites: MATH 151 and PHYS 208.

MARE 208 Mechanics of Materials  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Introduction to the study of stresses, strains, and deformation of a solid body which results when static forces are applied. Transformation of stresses and strains, torsion, beam deflection, and combined loadings are discussed.  
Prerequisite: MARE 205.

MARE 211 Steam Propulsion Plants  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Fossil fuel steam generators, shipboard propulsion turbines and condensers, reduction gears, line shafting, internal fittings and fluid flow paths, automatic controls, regulatory requirements for safety device settings, system tests and inspections, boiler water/feed water test and treatment, turbine/reduction gear lubrication, computer aided heat balances, parametric analysis of plant performance.

MARE 242 Manufacturing Methods I  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Introduction to manufacturing methods used in marine industries emphasizing fabrication techniques including oxy-acetylene cutting and welding, brazing, arc welding, pipe welding and sheet metal fabrication. Laboratory exercises will develop the knowledge and skills needed to perform fabrication operations, routine maintenance and emergency repairs of marine engineering structures and systems.

MARE 243 Manufacturing Methods II  
Credit 1. 0 Lecture Hours. 3 Lab Hours.  
Continued introduction to manufacturing methods used in marine industries including machine, foundry and forge work and other manufacturing technologies. Laboratory emphasizes machine shop practices including safety, use and care of machine and hand tools; measuring instruments, layout, gauging, cutting speeds and feeds, drilling, tapping, threading, turning and milling.  
Prerequisite: Approval of Instructor.

MARE 261 Engineering Analysis  
Credits 3. 3 Lecture Hours.  
Review of mathematical concepts previously studied (e.g., complex quantities, vectors and calculus), coupled with study of advanced concepts (e.g., differential equations, Laplace Transforms, statistics and numerical methods) with a view to emphasize applications in nuclear engineering, electrical engineering, thermodynamics, heat transfer and turbine theory.  
Prerequisite: MATH 152 or 161.
MARE 285 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Special problems in marine engineering technology not covered by any other course in the curriculum. Work may be in either theory or laboratory.  
Prerequisite: Approval of department head.

MARE 289 Special Topics  
Credits 1 to 5. 0 to 5 Lecture Hours. 3 to 5 Lab Hours.  
Selected topics in an identified area of marine engineering technology. May be repeated for credit.  
Prerequisite: Approval of instructor.

MARE 300 Intermediate Operations  
Credits 4. 4 Lecture Hours.  
Intermediate Operations. Training program for second sea-training period. Sea project required of each student under supervision of officer-instructors. Lifeboat and safety training.  
Prerequisite: Junior or senior classification or approval of instructor.

MARE 303 Marine Thermodynamics  
Credits 3. 3 Lecture Hours.  
Introduction to the theory of electronic circuits. Fundamentals and basic electrical power generation and distribution; AC and DC rotating machinery; transformers; controllers and safety devices; operation, maintenance and repair procedures and practices; static converters AC/DC and DC/AC that are used in modern electric propulsion systems.  
Prerequisite: MATH 161. Junior or senior classification or approval of instructor.

MARE 305 Fluid Mechanics Theory  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Theory of incompressible and compressible fluid flow, introduction to fluid power systems and controls, and dynamics of turbomachinery. Mathematical analysis of piping systems to determine pump head, system resistance, and pipe sizing optimization. Topics include physical properties of fluids, continuity equation, Bernoulli’s Equation, Darcy’s Equation, series and parallel flow, relative roughness, friction factors, dimensional analysis, and laws of similitude.  
Prerequisite: Junior or senior classification or approval of instructor.

MARE 306 Electrical Power II  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Electrical power generation and distribution; AC and DC rotating machinery; transformers; controllers and safety devices; operation, maintenance and repair procedures and practices; static converters AC/DC and DC/AC that are used in modern electric propulsion systems.  
Prerequisite: MARE 207.

MARE 307 Marine Electronics  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Introduction to the theory of electronic circuits. Fundamentals and basic concepts of semiconductors; solid-state components; power supplies; amplifiers; inverters; rectifiers; oscillators; digital and analog integrated circuits. Application in automation, motor controllers, battery-charging systems, communications; and propulsion plant monitoring systems.  
Prerequisite: MARE 207.

MARE 309 Marine Construction Materials  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Introduction to materials science and engineering, structural, property relationships; advanced manufacturing techniques from the point of view of marine applications such as subsea pipelines, ship hulls, etc.; corrosion and biofouling. Laboratory includes experimental testing of materials properties, materials syntheses and heat treatment techniques.  
Prerequisite: MARE 209.

MARE 312 Diesel Propulsion Plants  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Marine Diesel Engines. Comprehensive study of diesel engines, thermodynamics of air standard cycles, actual compression ignition engine cycles, emissions and emission controls, fuel injection systems and turbo charging systems, engine material properties, operational parameters including forces and temperatures resulting from combustion and inertial dynamics. Laboratory includes computer-aided parametric analysis of engine performance and use of low-speed diesel propulsion plant simulator.  
Prerequisites: MARE 305, MARE313. Junior or senior classification or approval of instructor.

MARE 313 Heat Transfer  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Introduction to heat transfer; basic heat transfer modes and different solution techniques; introduction to 1-D and 2-D heat conduction in transient and steady state conditions; fundamentals of convection heat transfer under different flow conditions; forced convection in internal and external flows; analysis and selection of heat exchangers; introduction to thermal radiation heat transfer.  
Prerequisites: MARE 261 and MARE 305 or concurrent enrollment.

MARE 314 Gas Turbine Power Generation  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Introduction to the Brayton cycle to gas turbine power cycles, including ideal gas cycle analysis, compressor design and construction, gas turbine construction, operation and maintenance for marine and industrial installations.  
Prerequisites: MARE 202, MARE 205, MARE 309 or concurrent enrollment and permission of instructor.

MARE 350 Commercial Cruise Internship  
Credits 4. 4 Other Hours.  
Training program for second sea-training period; sea project required of each student under supervision of officer-instructors; lifeboat and safety training.  
Prerequisites: MARE 100, MARE 200, MART 103. Junior or senior classification or permission of MARR and MART department heads.

MARE 400 Advanced Operations  
Credits 4. 4 Lecture Hours.  
Training program for third sea-training period. At the end of this period each student will have achieved the knowledge and will have demonstrated the ability to take complete charge of a modern marine power plant while underway at sea.  
Prerequisite: Junior or senior classification or approval of instructor.

MARE 401 Marine Auxiliary Systems  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Study of the principal shipboard auxiliary systems, including: auxiliary fired-boilers, sea water service, ballast, freshwater service, lubricating oil, fuel oil storage and transfer, distilling, and steering systems. Major components, operation and maintenance, and interrelationship with other auxiliary systems are covered. Additional topics include steam turbine, gas turbine, and diesel-driven electric power generators and support systems, as well as propulsion train power take-off type electric power generation systems.  
Prerequisites: MARE 305, 313. Junior or senior classification or approval of instructor.
MARE 402 Shipboard Automation and Control  
Credits 3. 3 Lecture Hours.  
Study of automation in marine power plants; including electronic and pneumatic proportional, integral and derivative control elements; applications in boiler combustion and water level control; engine speed control; remote sensing and performance monitoring systems.  
Prerequisites: MARE 307, 311, 312. Junior or senior classification or approval of instructor.

MARE 405 Fundamentals of Naval Architecture  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Ship geometry and arrangement; ship-form calculations; intact and damaged stability; ships’ structure; fundamentals of resistance and propulsion; ship motion, maneuverability, and control; introduction to ship design, construction, and overhaul.  
Prerequisites: Junior or senior classification or approval of instructor.

MARE 431 Subsea Technology  
Credits 3. 3 Lecture Hours.  
Theory, concepts, and practices of subsea projects and operations in the offshore oil and gas industry; field development, drilling, architecture, installation, intervention, mooring systems, operations, flow assurance, chemistry, materials, classification, economics and risk management.  
Prerequisite: Junior or senior classification or approval of instructor.

MARE 434 Offshore Energy, Oil, and Gas Production  
Credits 3. 3 Lecture Hours.  
Orientation to the offshore and gas industry; petroleum exploration, production, and marketing; platform and floating production facilities; operations; classification of production systems; economics and risk management.  
Prerequisite: Junior or senior classification or approval of instructor.

MARE 441 Engineering Economics and Project Management  
Credits 3. 3 Lecture Hours.  
Analysis of engineering economics and management, using costs and benefits of various engineering options. Topics include time value of money, cash flows, analysis techniques, interests rates, inflation, depreciation, optimization, statistics, network analysis and critical path programming.  
Prerequisite: Junior or senior classification or approval of instructor.

MARE 451 Senior Design Project I  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Introduction to design, modeling, testing and validation processes. Design of equipment, components or systems for marine and related power generation applications. Complete design process including: definition of the problem, research for existing designs and related technologies, conceptualization and evaluation of alternatives, development of preliminary design, refining and generation of final design and documents.  
Prerequisites: MARE 206, MARE 242, MARE 306, MARE 309, MARE 311, MARE 312, MARE 313, PHYS 208 (or concurrent enrollment) and senior classification.

MARE 452 Senior Design Project II  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
This course is a continuation of MARE 451. Development of theoretical, computational or experimental models using the design developed in MARE 451. Formulation, construction and/or fabrication work. Refining, experimenting and testing of models considering alternatives. Analyzing results and preparing and submitting design documents including a project report.  
Prerequisite: MARE 451.

MARE 484 Undergraduate Internship  
Credits 0 to 6. 0 to 6 Other Hours.  
Supervised study with an approved power generator, either electrical, mechanical, or thermal power. Alternatively, studies can be with a research, manufacturing or repair facility whose primary mission is to support power generation.  
Prerequisites: 2.5 GPR and completion of 300 level courses.

MARE 485 Directed Studies  
Credits 1 to 8. 1 to 8 Other Hours.  
Special problems in marine engineering technology not covered by any other course in the curriculum. Work may be in either theory or laboratory.  
Prerequisites: Approval of department head. Junior or senior classification or approval of instructor.

MARE 489 Special Topics  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of marine engineering technology. May be repeated for credit.  
Prerequisites: Junior or senior classification or approval of instructor.

MARE 491 Research in Marine Engineering Technology  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Research in Engineering Technology. Research conducted under the direction of faculty member in Marine Engineering Technology. May be repeated 2 times for credit. Please see academic advisor in department.  
Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.

MARR - Marine Engr Technology (MARR)

MARR 101 Marine Engineering Fundamentals  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
A study of basic marine engineering systems, with emphasis on propulsion plants; propulsion plant machinery, watch standing organization and duties, shipboard safety practices and equipment.

MARR 102 Engine Room Resource Management and Dynamics  
Credit 1. 0 Lecture Hours. 2 Lab Hours.  
Marine engineering watch standing and operations, safety and security, effective resource management and control of engine room equipment, leadership and managerial skills.

MARR 200 Basic Operations  
Credits 6. 6 Lecture Hours.  
Practical application of student’s classroom studies while at sea on training ship during sea-training period. Student required to complete several projects relating to engineering plant of ship.  
Prerequisite: MART 103.

MARR 300 Intermediate Operations  
Credits 6. 6 Lecture Hours.  
Training program for second sea-training period. Sea project required of each student under supervision of officer-instructors. Lifeboat and safety training.  
Prerequisite: Junior or senior classification or approval of instructor.
MARR 400 Advanced Operations
Credits 6. 6 Lecture Hours.
Training program for third sea-training period. At the end of this period each student will have achieved the knowledge and will have demonstrated the ability to take complete charge of a modern marine power plant while underway at sea.
Prerequisite: Junior or senior classification or approval of instructor.

MARR 451 Senior Capstone Project I
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Design, modeling, testing and validation processes; design of equipment, components, or systems for seagoing vessels; use of design manuals, material/equipment specifications and industry regulations applicable to marine engineering technology.
Prerequisites: MARE 206, 242, 309, 313; MARR 306, 311, 312; PHYS 208. Senior classification.

MARR 452 Senior Capstone Project II
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Continuation of MARR 451; implementation of ship-related project initiated and developed therein, which may include development of theoretical, computational or experimental models and/or formulation, construction, and fabrication work; refining, experimenting, and testing of models considering alternatives; analyzing results and preparing and submitting design documents including a project report.
Prerequisite: MARR 451.

MARS - Marine Science (MARS)

MARS 101 Marine Science Matters
Credit 1. 1 Lecture Hour.
A non-technical introduction to the field of marine sciences, including biology, ocean activities, and marine industries. Course includes lectures, seminars, outside speakers, and industrial contacts.

MARS 210 Marine Geography
Credits 3. 3 Lecture Hours.
Introduction to the physical and cultural patterns of the coastal zones of the world. Interrelationships between the physical forms and processes and the cultural patterns are used to analyze human use and abuse of the sea.

MARS 252 Introductory Marine Science Laboratory
Credit 1. 0 Lecture Hours. 3 Lab Hours.
Overview of the global ocean environment and the interrelated sub-disciplines; the important of the ocean for the earth's ecosystems and human impact on the ocean; field work and boat trip, water and benthic sediment collection and analysis; navigation chart work.
Prerequisite: OCNG 251 or concurrent enrollment.

MARS 280 Coastal and Ocean Resources
Credits 3. 3 Lecture Hours.
Coastal and Ocean Resources. Resources from the ocean including food, minerals, transportation and recreation. Methods of recovery and utilization of resources from the ocean, efficiency and cost effectiveness. Provides a foundation for understanding the wealth of resources available from the ocean and its margins, to include the impact of human activity on these resources.

MARS 281 Sophomore Seminar in Marine Sciences
Credit 1. 1 Lecture Hour.
Compilation and discussions of literature pertaining to topics in marine sciences. Emphasis placed upon preparation and presentation of a written report.
Prerequisite: Sophomore standing or approval of instructor.

MARS 285 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Special topics and problems suited to analysis by individuals or small groups concerning special aspects of marine sciences.
Prerequisite: Approval of department head.

MARS 289 Special Topics in Marine Sciences
Credits 1 to 4. 1 to 4 Lecture Hours.
Study of selected topics in an identified area of marine sciences.
Prerequisite: Approval of instructor.

MARS 303 Computing and Data Display
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Elements of programming and data display primarily through the MATLAB computing environment; includes an introduction to statistics and hypothesis testing with MATLAB.
Prerequisite: Junior or senior classification or approval of instructor.

MARS 305 Environmental Micropaleontology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Environmental Micropaleontology. Major animal, plant and protist microfossils groups, ecology, biostratigraphy, paleoenvironmental and paleoclimatic utility, primary preparation techniques, basic microscopy, research design and dissemination. Coastal foramanifera, thecamoebians and ostracods emphasized. Field trips required.
Prerequisites: GEOL 104. Junior or senior classification or approval of instructor.

MARS 306 Coastal Sedimentary Geology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
A survey of modern coastal sedimentary systems, including principles of sedimentology and sediment analysis. The laboratory includes a large group field projects. Local field trips required.
Prerequisites: GEOL 104. Junior or senior classification or approval of instructor.

MARS 310 Field Methods in Marine Sciences
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Techniques of documenting collected materials, the methods of reconnaissance and the mapping of traverses in the major coastal environments. Sampling and recording techniques, interview procedures, and the use of maps and remotely sensed imagery will be introduced.
Prerequisites: CHEM 102, PHYS 202 or PHYS 208, GEOL 104. Junior or senior classification or approval of instructor.

MARS 325 Introduction to GIS for Marine Sciences
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Geographic Information Systems (GIS) are introduced for marine sciences and management. Basic use of software including creation of GIS models is covered. Creating, editing and querying GIS shape files is treated utilizing one of the standard GIS software packages such as ArcGis.
Prerequisite: Junior or senior classification or approval of instructor.

MARS 330 Petroleum Geology
Credits 3. 3 Lecture Hours.
Origin, migration and accumulation of petroleum. Reservoir rock, traps, accumulation and conditions, and subsurface methods.
Prerequisites: GEOL 104. Junior or senior classification or approval of instructor.
MARS 340 Geochemistry
Credits 3. 3 Lecture Hours.
Chemical principles and processes that govern the behavior of geologic materials. Silica and carbonate low temperature equilibrium and kinetics. 
Prerequisites: CHEM 102, GEOL 104. Junior or senior classification or approval of instructor.

MARS 350 Advanced Computer Applications
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Data manipulation, merging, selection, filtering and querying in Microsoft Office primarily using large real data sets. Introduction to GIS, MatLab and other software relevant to science and/or business applications. Discussion of algorithm development in structured and object oriented programming languages.

MARS 360 Biochemistry
Credits 4. 4 Lecture Hours.
General introductory biochemistry; structures of the four classes of biologically important molecules (proteins, carbohydrates, lipids and nucleotides); how these biomolecules are generated from molecular building blocks; relationship of biomolecule structure to biochemical reactivity such as kinetics and enzyme regulation; membrane phospholipids and glycoproteins and the structure and function of membranes; catabolic reaction paths of monosaccharides and fatty acids; oxidative phosphorylation and photosynthesis. 
Prerequisites: BIOL 111, BIOL 112, CHEM 228. Junior or senior classification or approval of instructor.

MARS 361 Marine Biochemistry Laboratory
Credit 1. 3 Lab Hours.
Selected methods used to characterize, purify, identify and isolate biomolecules. The laboratory is designed to complement the MARS 360 lecture.
Prerequisite: MARS 360 or concurrent enrollment.

MARS 365 Integrated Marine Sciences Laboratory
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Integrated lectures, field and laboratory exercises for data collection and analysis of physical, chemical, biological and geological measurements in ocean, coastal and estuarine environments.
Prerequisites: MATH 142 or 152, PHYS 202 or PHYS 208, OCNG 251, MARS 252, CHEM 102 and CHEM 112, BIOL 112 and GEOL 101 and GEOL 102, junior or senior classification or approval of instructor.

MARS 370/GEOG 370 Coastal Processes
Credits 3. 3 Lecture Hours.
Introduction to the coastal system, waves and wave dominated coasts, shoreline morphodynamics, tidal and lake coasts, long term coastal development, sea level changes, subtidal and beach ecosystems, coastal dunes and wetlands, structures and organizations, coastal management and coastal hazards.
Cross Listing: GEOG 370/MARS 370.

MARS 380 Introduction to Physical Chemistry
Credits 3. 3 Lecture Hours.
Prerequisites: CHEM 102, MATH 151. Junior or senior classification or approval of instructor.

MARS 408 Estuarine and Coastal Hydrodynamics
Credits 3. 3 Lecture Hours.
Physical processes in estuarine and coastal environments in various time scales: turbulent, tidal and residual (subtidal); study of salts, suspended solids, nutrients and heat affected by water movement; physical, biogeochemical processes and mass transport. 
Prerequisites: MATH 251, PHYS 218, junior or senior classification or approval of instructor.

MARS 410 Physical Oceanography
Credits 3. 3 Lecture Hours.
Elements of the physics of the ocean; descriptive aspects and theoretical explanations of circulation, characteristic structure and waves. 
Prerequisites: OCNG 251, MARS 252, MATH 152, PHYS 208, junior or senior classification or approval of instructor.

MARS 412 Remote Field Investigations in Marine Sciences
Credits 1 to 6. 1 to 6 Lecture Hours.
An overview of marine sciences in remote locations varying by instructor and selected topics; lectures on recent scientific papers, methods and concepts related to field area; individual projects; data collection; data analysis and presentation. 
Prerequisite: Junior or senior classification or approval of instructor.

MARS 415 Remote Sensing Technology
Credits 3. 3 Lecture Hours.
An introduction to the uses of remote sensing technology in the marine sciences, including electromagnetic, acoustic, and seismic methods. Generation, transmission, and reception methods. Active and passive systems, multispectral techniques, and signal analysis systems. 
Prerequisites: PHYS 202 or 208, BIOL 112. Junior or senior classification or approval of instructor.

MARS 423 Ecological Economics
Credits 3. 3 Lecture Hours.
An integrated study of management of ecology and economics; conceptual and professional economic and environmental policies; ethical concerns and economic benefits of nature to humans, human and nature’s economies, and the complex connections between humans and nature with the valuing of ecosystems integrity. 
Prerequisite: Junior or senior classification.

MARS 425 Coastal Wetlands Management
Credits 3. 3 Lecture Hours.
Wetlands management laws, regulations, wetland delineation and applications of Geographic Information System (GIS) to wetlands management. Biological species in wetlands delineation. Basic biogeochemical cycles and interactions in wetlands. 
Prerequisites: BIOL 112, GEOL 104 and concurrent enrollment in MARS 426 or approval of instructor.

MARS 426 Coastal Wetlands Delineation Laboratory
Credit 1. 3 Lab Hours.
Coastal wetlands delineation, including mapping techniques, Geographic Information System (GIS) and theodolite. Biological species and biogeochemical factors in wetlands delineation. 
Prerequisites: BIOL 112, GEOL 104 and concurrent registration in MARS 425 or approval of instructor.
MARS 428 Coastal Development and Human Health
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Exploration of public environmental health issues associated with urbanization in coastal areas. Topics address population pressures on coasts, infectious and chronic disease, the natural and built environment, toxicology, sanitation, forms and media of pollution, and the application of environmental health science to coastal zone management. Prerequisites: CHEM 102 or equivalent; MARS 210 or equivalent. Junior or senior classification or approval of instructor. CHEM 383 and MARS 325 are recommended but not required.

MARS 430 Geological Oceanography-Plate Tectonics
Credits 3. 3 Lecture Hours.
Geological Oceanography-Plate Tectonics. Understanding the complex interactions of the earth system and the critical role that geological oceanography plays in these interactions, specifically the plate tectonic aspects of geological oceanography. Prerequisites: GEOL 101, OCNG 251, junior or senior classification or approval of instructor.

MARS 431 Geological Oceanography-Earth's Climate
Credits 3. 3 Lecture Hours.
Geological Oceanography - Earth's Climate. Understanding the complex interactions of the earth system and the critical role that geological oceanography plays in these interactions, specifically the paleoceanographic/climate change aspects of geological oceanography. Prerequisites: GEOL 101, OCNG 251, junior or senior classification or approval of instructor.

MARS 432 Peak Oil, Global Warming and Resource Scarcity
Credits 3. 3 Lecture Hours.
The concept of peak oil, resource depletion, and human-induced climate change and the broad consequences for food and water supplies, mortality rates, conflict, migration, and political stability; scientific/social/political debates surrounding these issues, and the individual/local/national/global options for living in a globally-warmed world with declining natural resources.
Prerequisites: Any two from GEOL 104, OCNG 251, MARS 280 or approval of instructor. Junior or senior classification.

MARS 435 Exploration Geophysics
Credits 3. 3 Lecture Hours.
Physiomechanical properties of rocks and sediments. Seismic reflection and refraction principles applicable to offshore, coastal and onshore exploration. Determination of media velocity and stratigraphy from reflection and refraction studies in both marine and non-marine systems.
Prerequisites: PHYS 202 or PHYS 208, GEOL 104, MATH 151. Junior or senior classification or approval of instructor.

MARS 440 Chemical Oceanography
Credits 3. 3 Lecture Hours.
Composition of sea salt and dissolved material in the ocean; biogeochemistry and measurements of oxygen, nutrient and other major elements, trace metals and radioisotopes; formation, composition and alterations of detrital material and marine sediments and other chemical processes; simple models relating ocean chemistry to the circulation of masses of water.
Prerequisites: CHEM 102, OCNG 251, junior or senior classification or approval of instructor.

MARS 450 Principles of Marine Instrumental Analysis
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Fundamental principles and practical applications for state-of-the-art analytical instrumentation applied to marine and environmental science. Topics include atomic and molecular spectroscopy, gas and liquid chromatography, radiochemistry, x-ray spectroscopy, mass spectrometry and field instrumentation. Students work with instruments and make presentation on them to the class.
Prerequisites: CHEM 102 and 228, PHYS 202, MATH 131 or 151. Junior or senior classification or approval of instructor.

MARS 456 Coastal Water Policy
Credits 3. 3 Lecture Hours.
History, past and present legislation, the government entities and agencies molding the policies affecting coastal water policy in Texas.
Prerequisite: Junior or senior classification or approval of instructor.

MARS 460 Capstone Undergraduate Research Experience I
Credit 1. 1 Lecture Hour.
Methodology for research outlines, organization and strategies; research ethics, writing and presentation of results.
Prerequisites: MARS 491 or concurrent enrollment, senior classification or approval of instructor.

MARS 461 Capstone Undergraduate Research Experience II
Credit 1. 1 Lecture Hour.
Research and scientific communications; development of a scientific abstract, poster presentation, oral presentation or written scientific paper.
Prerequisites: MARS 491 or concurrent enrollment, senior classification or approval of instructor.

MARS 470 Eco-Environmental Modeling
Credits 3. 3 Lecture Hours.
Biological components are in chemical and physical environments which are influenced by the bio-system and flows of energy, water and chemical species. Coupling to the complex atmospheric, aquatic and terrestrial systems is important. Modeling entails mathematical tools and the underlying science, focusing on scientific models, from the simplest to the elaborate.
Prerequisites: CHEM 102, BIOL 112 and MATH 151 or approval of instructor.

MARS 481 Seminar
Credit 1. 1 Lecture Hour.
Problem-oriented discussion session. Topics and reports selected for current relevance. May be repeated once only for credit.
Prerequisite: Junior or senior classification or approval of instructor.

MARS 484 Undergraduate Internship
Credits 0 to 6. 0 to 6 Other Hours.
Supervised study in a research or teaching laboratory within or outside of the Texas A&M University System. Student involvement is to consist of real-life learning or marine sciences research, teaching, management or a combination of these.
Prerequisites: Junior or senior classification or approval of instructor. Approval of the department head.

MARS 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Special topics and problems suited to analysis by individuals or small groups concerning special aspects of marine sciences.
Prerequisites: Junior or senior classification or approval of instructor. Approval of department head.
MARS 488 Writing Intensive Directed Studies in Marine Sciences
Credits 1 to 6. 1 to 6 Other Hours.
A writing-intensive course leading to the equivalent of a mini thesis in an area of interest to the faculty and student; introduces students to the rigors of writing for publication in professional journals in their major.
Prerequisite: Junior or senior classification.

MARS 489 Special Topics in Marine Sciences
Credits 1 to 4. 1 to 4 Lecture Hours.
Study of selected topics in an identified area of marine sciences.
Prerequisite: Junior or senior classification or approval of instructor.

MARS 491 Research in Marine Sciences
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in Marine Sciences. May be repeated 2 times for credit. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

MART - Marine Transportation (MART)

MART 103 Basic Safety and Lifeboatman Training
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to lifesaving equipment and apparatus, personal survival techniques, personal social and environmental responsibility and introductory medical first aid and CPR; practical lifeboat and survival training for the U.S. Coast Guard certification as life boatman.
Prerequisite: Admission to license option program.

MART 115 Seapmsmanship I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
(STCW). Theory and application of traditional seapmsmanship, such as handling of natural fiber, synthetic and wire ropes, block and tackle and marlinespike; introduction to competencies of the deck department, including safe systems of work, inspections and maintenance, anchoring, mooring operations, ladder use, crane operations and duties of the lookout and quartermaster.
Prerequisite: Admission to license option program.

MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of MART department head.

MART 202 Ship Stability and Trim
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Principles of flotation and buoyancy; inclining experiments; free surface; transverse and longitudinal stability; trim; motion of ship in waves and seaways; application of stability, trim and stress tables; effect of center of gravity on seaworthiness and stability; actions in event of partial loss of intact buoyancy; fundamentals of watertight integrity.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204 or concurrent enrollment, or approval of MART department head.

MART 204 Terrestrial Navigation
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamentals of piloting, chart construction and development, aids to navigation, useful publications, principles of magnetism and the magnetic compass, great circle, Mercator and middle latitude sailing.
Prerequisites: Admission to deck license option program; algebra and trigonometry recommended.

MART 205 Marine Surveying
Credits 3. 3 Lecture Hours.
Fundamentals of marine surveying using the various types of maritime surveys; writing survey reports by meeting regulatory and industry standards for submission to maritime clients.
Prerequisites: MART 115 and MART 202 (MART majors), or MARA 205 (MARA majors); or MARR 101 (MARR majors); or MARE 100 (MARE-NLO majors); or approval of instructor.

MART 208 Maritime Meteorology
Credits 3. 3 Lecture Hours.
Weather and forecasting techniques used by merchant mariners to determine cloud formation, precipitation, visibility, atmospheric pressure, fronts, ocean currents, weather and voyage routing and ship maneuvering based upon ship’s technology and reporting equipment; ocean passage planning.
Prerequisite: MART 204 or concurrent enrollment or approval of department head.

MART 210 Integrated Navigation I: RADAR/ARPA/ECDIS
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Theory, operation and interpretation of marine radar and automatic radar plotting aids (ARPA) and Electronic Chart Display Systems (ECDIS); introductory level watchkeeping, including applied use of radar, ARPA and ECDIS: U.S. Coast Guard Certification as “RADAR Observer” and Standards of Training, Certification and Watchkeeping (STCW) Radar and ARPA endorsements.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.

MART 212 Marine Dry Cargo Operations
Credits 3. 3 Lecture Hours.
Modern dry cargo principles associated with handling general cargo, bulk cargo, refrigerated cargo, dangerous cargo, containers, roll-on roll-off; cargo ventilation, securing of cargo, stability and trim, cargo gear stresses and heavy lift operations; documentation required for cargo operations, along with practical cargo stowage problems.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.
MART 213 Liquified Gas Tankers
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Preparation as cargo officer for loading, discharging and transit of liquefied gas cargoes; emphasis on physical and chemical properties, operations, safety, firefighting and pollution prevention.
Prerequisites: MART 200 or NAUT 200 or concurrent enrollment or approval of department head.

MART 215 Seafarers II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Topics include mechanical appliances aboard ship, accident prevention, vessel sanitation, vessel operations, marine inspection laws and regulations, communications, ship’s business and International Conventions.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.

MART 285 Directed Studies
Credits 1 to 4. 1 to 4 Lecture Hours.
Directed study in problems in marine transportation not covered by other courses in the department.
Prerequisite: Approval of department head.

MART 289 Special Topics in Marine Transportation
Credits 1 to 4. 1 to 4 Lecture Hours.
Study of selected topics in an identified area of marine transportation or nautical science.
Prerequisite: Approval of department head.

MART 300 Deck Sea Training II: Intermediate Communications, Navigation and Seamanship
Credits 4. 4 Other Hours.
Practical application of shoreside studies aboard training ship during second training cruise; intermediate projects in communications, navigation, seamanship, and rules of the road.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.

MART 303 Celestial Navigation
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Full range of celestial navigation; survey of nautical astronomy, sight reduction, sextants, compass error determination, and solutions of the navigational triangle by various methods.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of MART department head.

MART 305 Ship Construction and Stability
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Shipbuilding nomenclature, dimensions, construction and classification. Classification societies, shipbuilding materials and methods, structural components. Ship’s line drawing and form calculations; principles of flotation and buoyancy; inclining experiments; free surface; transverse stability; trim and longitudinal stability; motion of ships in waves, seaways and dynamic loads; ship’s structure tests and propulsion; labs focus on manual and computer-based stability and trim calculations using standard industry-based software.
Prerequisites: Junior or senior classification. MART 103, PHYS 201 or PHYS 218 or approval of instructor.

MART 307 Global Maritime Distress Safety System
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Requirements, regulations, equipment, principles and hands-on operating procedures of each Global Maritime Distress Safety System subsystem, including: SARTS, EPIRBS NAVTEX, INMARSAT, SAFETYNET, VHF Survival Craft Transceivers, DSC, and HF Radio telephone; USCG and FCC certification as GMDSS Operator and Maintainer; minimum passing grade 75%.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.

MART 308 Fast Rescue Craft
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Search and rescue techniques through fast rescue craft maneuvers and team management; description of various rescue craft and U.S. Coast Guard "Fast Rescue Craft" Standard of Watchkeeping endorsement.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.

MART 310 Integrated Navigation II: Electronic Navigation
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Theory, operation and application of marine electronic navigation systems and aids; includes marine gyrocompass, vessel steering systems, hydrosonic systems, satellite navigation systems, AIS and VDR; intermediate level watchkeeping, including applied use of radar, ARPA and ECDIS.
Prerequisites: MART 200 or NAUT 200; MART 204, MART 210, MART 303 and MART 321, or concurrent enrollment or approval of MART department head.

MART 311 Tug and Towing Operations
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Knowledge associated with the safe, efficient operation of towing vessels through classroom discussion and through underway, hands-on vessel training aboard the T/V Ranger and barges.
Prerequisites: MART 300 or MART 350 or NAUT 300, or concurrent enrollment or approval of department head.

MART 313 Marine Liquid Cargo Operations
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Principles and practice of bulk liquid, gas handling and carriage by water craft; theoretical and practical problems involved in loading, stowing and discharging of petroleum, chemical, elevated temperature and cryogenic cargoes; marine pollution abatement, personnel safety and firefighting techniques and systems.
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.

MART 315 Seafarers III
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Principles and methods of propulsion and steering of ships including hull, propeller and rudder design; ship handling at sea, in narrow channels, docking, undocking, mooring; study of the principles of hydrodynamics that govern ship movement.
Prerequisites: MART 300 or MART 350 or NAUT 300, or concurrent enrollment or approval of instructor.

MART 321 Navigation Rules, International and Inland
Credits 2. 2 Lecture Hours.
Purpose, application and knowledge of the International Regulations for Preventing Collision at Sea (COLREGS) and the Inland Navigation Rules and Regulations (Inland Rules).
Prerequisites: MART 200 or NAUT 200; MART 103, MART 115, MART 201 and MART 204, or concurrent enrollment or approval of department head.
MART 350 Deck Sea Training II – Commercial Internship
Credits 4. 4 Other Hours.
Practical application of shoreside studies aboard an assigned merchant vessel during second training cruise; intermediate projects in communications, navigation, seamanship, rules for the road and other subjects pertaining to the maritime industry. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: MART 200 or NAUT 200, MART 202, MART 210, MART 212, MART 215, MART 303, and MART 321, or concurrent enrollment; junior or senior classification or approval of MART department head.

MART 400 Deck Sea Training III: Advanced Communications, Navigation and Seamanship
Credits 4. 4 Other Hours.
Practical application of shoreside studies aboard training ship during third training cruise; advanced projects in communications, navigation, seamanship and rules of the road.
Prerequisites: MART 300 or MART 350 or NAUT 300, MART 307, MART 310 and MART 313, or concurrent enrollment; junior or senior classification or approval of MART department head.

MART 401 Maritime Security
Credits 3. 3 Lecture Hours.
Presentation and analysis of historical and current maritime security issues, leading to the understanding of, and proficiency in, security-related duties and responsibilities of licensed Deck Officers aboard ship and of maritime industry personnel ashore.
Prerequisites: MART 300 or MART 350 or NAUT 300, or concurrent enrollment or approval of department head.

MART 403 Advanced Topics in Shipboard Operations
Credits 2. 2 Lecture Hours.
Advanced shipboard operations for the Third Mate, AGT, Oceans as a bridge watchstander or cargo officer on container vessels, bulk carriers, tankers or gas carriers; focus on all areas of concern to a watchstander.
Prerequisites: MART 300 or MART 350 or NAUT 300, or concurrent enrollment or approval of department head.

MART 404 The Navigator
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Intensive application all available means of navigation; including principles of electronic, terrestrial and celestial; demonstration of knowledge, understanding and proficiency in U.S. Coast Guard examination topics.
Prerequisites: MART 300 or MART 350 or NAUT 300, or concurrent enrollment or approval of department head.

MART 410 Integrated Navigation III: Bridge Watchstanding
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Advanced level Bridge Watchkeeping; integration of navigation, communications and seamanship in Bridge Resource Management (BRM) training required under the International Convention on the Standards for Training and Certification of Watchkeepers, using simulator-based teaching techniques.
Prerequisites: MART 300 or MART 350 or NAUT 300; MART 210, MART 310 and MART 321, or concurrent enrollment or approval of MART department head.

MART 484 Internship
Credits 0 to 6. 0 to 6 Other Hours.
Special topics and problems in field and/or laboratory work suited to analysis by individuals or small groups concerning internships of marine transportation; may require a report describing techniques and results. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification or approval of department head.

MART 485 Directed Studies
Credits 1 to 4. 1 to 4 Lecture Hours.
Directed study in problems in marine transportation not covered by other courses in the department.
Prerequisite: Senior classification or approval of department head.

MART 489 Special Topics in Marine Transportation
Credits 3. 1 to 3 Lecture Hours. 0 to 3 Lab Hours.
Study of selected topics in an identified area of marine transportation or nautical science.
Prerequisites: Approval of MART department head. Junior or senior classification or approval of instructor.

MART 491 Research in Marine Transportation
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in Marine Transportation. May be repeated 2 times for credit. See academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

MART 498 Maritime Medical Care
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Basic and advanced training for medical care of the sick and injured in the maritime environment; fundamentals of identification and assessment of and appropriate interventions for life-threats and other medical or trauma related conditions commonly encountered at sea; must complete course within one year of graduation.
Prerequisites: MART 300 or MART 350 or NAUT 300, or concurrent enrollment, or approval of MART department head.

MASC 351 Problem Solving in Mathematics
Credits 3. 3 Lecture Hours.
Problem solving strategies in math and science; evaluate conjectures and arguments; writing and collaborating on problem solutions; posing problems and conjectures; constructing knowledge from data; developing relationships from empirical evidence; connecting mathematics concepts; readings, discussions, and analyses will model and illustrate mathematics problems solving and proofs.
Prerequisites: 6 hours of mathematics.
MASC 371 Inquiries in Life and Earth Sciences  
Credits 3. 3 Lecture Hours.  
Integration and connections among topics in the life and earth sciences–diversity, natural selection, ecosystem development, earth’s features, and weather systems; inquiry emphasizing experimental design, data analysis and collection; use of models in the life and earth sciences. 
Prerequisites: BIOL 111 or BIOL 113 and BIOL 123, CHEM 106 and CHEM 116, GEOL 101 or GEOG 203, ASTR 101 and ASTR 102, and PHYS 205; junior or senior classification; admission to teacher certification.

MASC 450 Integrated Mathematics  
Credits 3. 3 Lecture Hours.  
Integration and connections among topics and ideas in mathematics and other disciplines; connections between algebra and geometry and statistics and probability; focus for integration with authentic problems requiring various branches of mathematics. 
Prerequisites: MASC 351; admission to teacher education; junior classification.

MASC 475 Inquiries in Physical Science  
Credits 3. 3 Lecture Hours.  
Integration and connections among topics in physical sciences–matter, energy, force, motion, scientific cycles; focuses on inquiry emphasizing experimental design, data analysis and collection, and use of models in the physical sciences. 
Prerequisites: BIOL 111, BIOL 113 and BIOL 123, CHEM 106 and CHEM 116, GEOL 101 or GEOG 203, ASTR 101 and ASTR 102, and PHYS 205; junior or senior classification; admission to teacher certification.

MASE - Maritime Systems Engr (MASE)

MASE 336 Flow Measurement Fundamentals  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Introduction to fundamental principles of measuring fluctuating fluid velocities in open channels, simple pipe flow systems and surface waves. Laboratory includes experimental investigation of classic fluid dynamics and introduction to PIV systems. 
Prerequisites: PHYS 208, CVEN 311 or concurrent registration. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

MASE 400 Introduction to Coastal Engineering  
Credits 3. 3 Lecture Hours.  
Mechanics of shallow water wave motion; wave diffraction, refraction and reflection; wave forecasting; water level fluctuations; coastal processes and geomorphology; erosion control and shoreline stabilization; coastal structures; beach nourishment; dredging; introduction to physical and computer models and modeling techniques; design in coastal engineering. 
Prerequisites: OCEN 300; senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

MASE 407 Capstone Design II  
Credits 3. 6 Lab Hours.  
Design of a major engineered system based on a proposal developed in MASE 406 completed as a group project; realistic application of engineering skills and tools, experience managing a significant engineering-design effort. This is a writing-intensive course including a major report and weekly one-page written reports. 
Prerequisites: MASE 406. Enrollment in OCSE major degree sequence.

MASE 410 Measurements in the Ocean Laboratory  
Credit 1. 3 Lab Hours.  
Fundamental techniques and instrumentation for field and laboratory measurements pertaining to coastal and ocean engineering (e.g., currents, wave height, wave/sediment interaction, mass transport, surveying, etc.); experiment planning; data analysis and presentation; written reports on methodology, analysis, and results of experiments. 
Prerequisites: OCEN 300, MASE 400. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

MASE 485 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Directed study on selected current problems in the ocean and/or maritime industry. Offered to enable individuals or groups to undertake and complete with credit some specialized investigation not covered by other courses. 
Prerequisites: Approval of department head. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

MASE 491 Research in Maritime Systems Engineering  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in Maritime Systems Engineering. May be repeated 2 times for credit. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. 
Prerequisites: Junior or senior classification and approval of instructor. Enrollment in OCSE major degree sequence.

MASE 489 Special Topics  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in a identified area of maritime systems engineering. May be repeated for credit. 
Prerequisite: Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

MASE - Maritime Studies (MAST)

MAST 101 Connections  
Credit 1. 1 Lecture Hour.  
A first year experience seminar to explore the connections between academics disciplines to develop creative and critical thinking strategies which will increase abilities to implement solutions, refine information literacy skills, and identify the resources available for a successful transition from high school to the university environment. Prerequisites: None.

MAST 265 Elissa Sail Taining I  
Credits 3. 1 Lecture Hour. 6 Lab Hours.  
Eliissa Sail Training I. Fundamentals of seamanship on a late 19th century square-rigged sailing vessel. Students will learn to both sail and care for the 1877 barque ELISSA, operated by the Texas Seaport Museum. Lectures on maritime life supplement physical activity. 
Prerequisite: Department approval.
M A S T 2 6 6 Elissa Sail Taining II
Credits 3. 1 Lecture Hour. 7 Lab Hours.
Elissa Sail Training II. Sailing and crewmanship on the 1877 barque ELISSA, operated by the Texas Seaport Museum. Includes sail training at sea.
Prerequisite: MAST 265.
M A S T 2 8 5 Directed Studies
Credits 1 to 4. 1 to 4 Lecture Hours.
Individually supervised research or advanced study on restricted area not covered in regular courses.
M A S T 2 8 9 Special Topics
Credits 1 to 3. 1 to 3 Lecture Hours.
Credit Selected topics in a identified area of maritime studies. May be repeated for credit.
M A S T 3 2 0 Introduction to Museums and Conservation
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to basic issues related to the conservation, curation, management and presentation of museum collections. Emphasis placed on archaeology and historical collections, or other collections with cultural significance. Basic conservation techniques for materials as well as proper care and store of collections. Museum planning and exhibit design will be discussed.
Prerequisite: Junior or senior classification or approval of instructor.
M A S T 3 2 1 Industrial Diving Orientation
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Illustrates the realities of operating in the scientific, commercial and military diving disciplines; practice real world training scenarios involving multiple aspects of each of the three fields.
M A S T 3 3 3 Viking Archaeology and Norse Mythology
Credits 3. 3 Lecture Hours.
Overview of Viking Age (ca. 800 to 1100 C.E.) in Northern Europe; topics include Norse seafaring, world-view, society, archaeology, religion and cosmology as know from the archaeological and literary record.
Prerequisite: Junior or senior classification or approval of instructor.
M A S T 3 3 6 Maritime Foreign Policy
Credits 3. 3 Lecture Hours.
Strategies used by governments to guide international actions; objectives of state leaders in decision making; sources, processes, objectives and outcomes of maritime policy choices.
Prerequisite: Junior or senior classification or approval of instructor.
M A S T 3 4 0 Museums and the Construction of Identities
Credits 3. 3 Lecture Hours.
Examination of the cultural construction of identity within the museum context; personal and collective, corporeal and virtual, national and global identities; ways in which those identities are formed and preformed.
Prerequisites: Junior or senior classification or approval of instructor.
M A S T 3 4 5 Texas Maritime Culture and History
Credits 3. 3 Lecture Hours.
The coastal peoples, maritime history and culture of the Texas Gulf Coast ranging from pre-historic times to the present day; geography’s influence on exploration, resources utilization, development and inland access; Texas ports historic and modern; shipwreck sites and historical texts; La Salle’s La Belle, Texas Navy, Mexican War logistics; Civil War Naval actions, Texas Fisheries, tourism and recreation.
Prerequisite: Junior or senior classification.
M A S T 3 5 0 A History of Wooden Ship Construction
Credits 3. 3 Lecture Hours.
This course is designed to give undergraduate students an overview of ship construction and possible cultural factors that may influence how a shipwright builds a vessel.
Prerequisites: Junior or senior classification and ANTH 316 or ANTH 318.
M A S T 3 5 2 Crafts of the Maritime World
Credits 3. 3 Lecture Hours.
An exploration of various crafts, skills and aesthetic/design used in and supporting the maritime world; hands-on activities and practical experience of various skills and processes, using traditional tools required to put a ship to sea; from carpentry to rope-making, sewing canvas sails to making blocks.
Prerequisites: Junior or senior classification.
M A S T 3 5 4 Ancient Egyptian Seafaring
Credits 3. 3 Lecture Hours.
Archaeology, iconography and written records of ancient Egypt as they relate to local and international trade by land, river and sea, beginning in Neolithic times (c. 5000 B.C.) to the end of the New Kingdom (c. 1069 B.C.).
Prerequisites: ANTH 316; junior or senior classification or approval of instructor.
M A S T 3 6 5 Material Culture
Credits 3. 3 Lecture Hours.
Examination of material evidence of human life, from cradles to graves, churches to forts, teapots to landscapes; material culture artifacts, the processes and technologies used to create them and their use in every day life; application to archaeology, museum studies and basic engineering.
Prerequisites: Junior or senior classification or approval of instructor.
M A S T 3 6 9 Information Collections Care and Management
Credits 3. 3 Lecture Hours.
Managing collections in libraries, archives and museums; media and collections storage; digitization and metadata processes; use of writing styles and citations.
Prerequisites: Junior or senior classification or approval of instructor.
M A S T 3 7 1 Archaeology of the Pacific
Credits 3. 3 Lecture Hours.
Overview of the archaeology, history and cultures of the Pacific Rim; emphasizing the cultures of Polynesia, Melanesia, and Micronesia.
Prerequisite: Junior or senior classification or approval of instructor.
M A S T 4 1 1 International Maritime Culture
Credits 3. 3 Lecture Hours.
Strategies used in the exploitation of marine, coastal, and island habitats throughout human evolutionary history and the variety and complexity of adaptations in such environments. Classes will be devoted to lectures and group discussions with occasional slide or movie presentations.
Prerequisites: ANTH 201 or GEOG 201. Senior Classification or approval of instructor.
M A S T 4 2 5 Thesis and Technical Writing
Credits 3. 3 Lecture Hours.
Rhetorical techniques for professional expository prose; intertextual argumentation and analysis.
Prerequisite: Junior or senior classification; ENGL 104 and ENGL 203 or ENGL 210.
MAST 441 Maritime Piracy  
Credits 3. 3 Lecture Hours.  
Research of social, economic, political and cultural aspects of piracy from ancient to modern times; presentation of findings; understanding modern perception of pirates through modern art, literature and movies.  
Prerequisites: Junior or senior classification and approval of instructor.

MAST 470 Advanced Museum Studies  
Credits 3. 3 Lecture Hours.  
The diversity within museums, how each facet interacts with each other, their function to museums as a whole; museum professions and their respective responsibilities, strategies and approaches used in planning, development, and implementation.  
Prerequisite: MAST 320.

MAST 480 Honors Seminar in Service Learning  
Credit 1. 1 Lecture Hour.  
Opportunities for community service through active community participation; includes structured time for reflection; use of skills and knowledge in real-life situations; extend learning beyond the classroom; foster a sense of caring for others.  
Prerequisites: Junior or senior classification or permission from the instructor and must be a member of the Honors Program.

MAST 481 Seminar in Maritime Studies  
Credit 1. 1 Lecture Hour.  
This course is intended to provide students with the opportunity to conduct in-depth research on a particular issue, event, period, or people in maritime studies.  
Prerequisite: This one-credit hour course is open to senior maritime studies majors or approval of instructor.

MAST 484 Undergraduate Internship  
Credits 0 to 6. 0 to 6 Other Hours.  
Supervised study in a research or teaching laboratory remote from TAMUG. Student involvement is to consist of real-life learning or research, teaching, management, or a combination of these.  
Prerequisite: Junior or senior classification or approval of instructor.

MAST 485 Directed Studies  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Individually supervised research or advanced study on restricted area not covered in regular courses.  
Prerequisite: Junior or senior classification or approval of instructor.

MAST 489 Special Topics  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in a identified area of maritime studies. May be repeated for credit.  
Prerequisite: Junior or senior classification or approval of instructor.

MAST 491 Research in Maritime Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in Maritime Studies. May be repeated 2 times for credit. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.

MAST 493 Maritime Studies Travel Experience  
Credits 1 to 6. 1 to 6 Lecture Hours.  
Combination of classroom and travel emphasizing cultural, archaeological, political and historical aspects of maritime humanities related topics. May be taken two times for credit.  
Prerequisite: Junior or senior classification or approval of instructor.

MATH - Mathematics (MATH)  

MATH 102 Algebra  
Credits 3. 3 Lecture Hours.  
(MATH 1314, 1414) Algebra. Sets, structure of number system; absolute values, solution sets of linear and nonlinear equations, of systems of equations, and of inequalities; relations and functions, graphical representations, graphical representations, progressions, mathematical induction, determinants.

MATH 131 Mathematical Concepts—Calculus  
Credits 3. 3 Lecture Hours.  
Mathematical Concepts—Calculus. Limits and continuity; rates of change, slope; differentiation: the derivative, maxima and minima; integration: the definite and indefinite integral techniques; curve fitting. No credit will be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171.  
Prerequisites: High school algebra I and II and geometry.

MATH 140 Mathematics for Business and Social Sciences  
Credits 3. 3 Lecture Hours.  
(MATH 1324) Mathematics for Business and Social Sciences. (3.0). Application of common algebraic functions, including polynomial, exponential, logarithmic and rational, to problems in business, economics and the social sciences; includes mathematics of finance, including simple and compound interest and annuities; systems of linear equations; matrices; linear programming; and probability, including expected value. No credit will be given for more than one of MATH 140, MATH 141 and MATH 166.  
Prerequisite: High school algebra I and II and geometry.

MATH 141 Finite Mathematics  
Credits 3. 3 Lecture Hours.  
Linear equations and applications; systems of linear equations, matrix algebra and applications, linear programming, probability and applications, statistics. No credit will be given for more than one of MATH 140, MATH 141 and MATH 166.  
Prerequisites: High school algebra I and II and geometry.

MATH 142 Business Calculus  
Credits 3. 3 Lecture Hours.  
(MATH 1325, MATH 1425) Business Calculus. Derivatives, curve sketching and optimization, techniques of derivatives, logarithms and exponential functions with applications, integrals, techniques and applications of integrals, multivariate calculus. No credit will be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171.  
Prerequisites: MATH 140 or equivalent or acceptable score on Texas A&M University math placement exam.

MATH 147 Calculus I for Biological Sciences  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Introduction to differential calculus in a context that emphasizes applications in the biological sciences. No credit will be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171.  
Prerequisite: MATH 150 or equivalent or acceptable score on TAMU Math Placement Exam.

MATH 148 Calculus II for Biological Sciences  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Introduction to integral calculus in a context that emphasizes applications in the biological sciences; ordinary differential equations and analytical geometry. No credit will be given for more than one of MATH 148, MATH 152 and MATH 172.  
Prerequisite: MATH 147 or approval of instructor.
MATH 150 Functions, Trigonometry and Linear Systems
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(MATH 2412) Functions, Trigonometry and Linear Systems. Graphs, functions, college algebra and trigonometry, linear systems and vectors.

MATH 151 Engineering Mathematics I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(MATH 2413) Engineering Mathematics I. Rectangular coordinates, vectors, analytic geometry, functions, limits, derivatives of functions, applications, integration, computer algebra. MATH 171 designed to be a more demanding version of this course. No credit will be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171.
Prerequisite: MATH 150 or equivalent or acceptable score on TAMU Math Placement Exam.

MATH 152 Engineering Mathematics II
Credits 4. 3 Lecture Hours.
(MATH 2414) Engineering Mathematics II. Differentiation and integration techniques and their applications (area, volumes, work), improper integrals, approximate integration, analytic geometry, vectors, infinite series, power series, Taylor series. MATH 152 designed to be a more demanding version of this course. No credit will be given for more than one of MATH 148, MATH 152 and MATH 172.
Prerequisite: MATH 151 or equivalent.

MATH 150 or equivalent.

MATH 161 Engineering Mathematics II
Credits 3. 3 Lecture Hours.
Differentiation and integration techniques and their applications (area, volumes, work), improper integrals, approximate integration, analytic geometry, vectors, infinite series, power series, Taylor series.
Prerequisite: MATH 151 or equivalent. Credit will not be given for more than one of MATH 152, 161 and 172.

MATH 166 Topics in Contemporary Mathematics II
Credits 3. 3 Lecture Hours.
Finite mathematics, matrices, probability and applications. No credit will be given for more than one of MATH 140, MATH 141 and MATH 166.
Prerequisites: High school algebra I and II and geometry.

MATH 167 Explorations in Mathematics
Credits 3. 3 Lecture Hours.
Application of mathematics to topics of contemporary societal importance using quantitative methods; may include elements of management science (optimal routes, planning and scheduling), statistics (sampling/polling methods, analyzing data to make decisions), cryptography (codes used by stores, credit cards, internet security), fairness (apportionment, voting) patterns (symmetry, tessellations, fractals), world health.
Prerequisites: High school algebra I and II.

MATH 170 Freshman Mathematics Laboratory
Credit 1. 2 Lab Hours.
Computing and problem solving laboratory; introduction to the various mathematical disciplines; development of skills in mathematical problem solving and skills in teamwork. May be taken two times for credit.
Prerequisites: Concurrent enrollment in MATH 171 or MATH 172; admission to College of Science.

MATH 171 Analytic Geometry and Calculus
Credits 4. 4 Lecture Hours.
Vectors, functions, limits, derivatives, Mean Value Theorem, applications of derivatives, integrals, Fundamental Theorem of Calculus. Designed to be more demanding than MATH 151. No credit will be given for more than one of MATH 131, MATH 142, MATH 147, MATH 151 and MATH 171.
Prerequisite: MATH 150 or equivalent or acceptable score on TAMU Math Placement Exam.

MATH 172 Calculus
Credits 4. 4 Lecture Hours.
Techniques of integration, applications of integrals, improper integrals, sequences, infinite series, vector algebra and solid analytic geometry. Designed to be more demanding than MATH 152. No credit will be given for more than one of MATH 148, MATH 152 and MATH 172.
Prerequisite: MATH 147, MATH 151 or MATH 171 or equivalent with a grade of C or better.

MATH 200 Horizons of Mathematics
Credit 1. 1 Lecture Hour.
Overview of different areas and topics of mathematics including logic, infinite sets, elements of topology, elements of history of mathematics; introduction to future courses in math degree plans and to some areas of research done by mathematics department faculty; topics may vary at the discretion of the instructor. 
Prerequisites: MATH and APMS majors; freshmen or sophomore classification; approval of instructor.

MATH 220 Foundations of Mathematics
Credits 3. 3 Lecture Hours.
Foundations of mathematics including logic, set theory, combinatorics, and number theory.
Prerequisite: MATH 148, MATH 152 or MATH 172 or equivalent with a grade of C or better.

MATH 221 Several Variable Calculus
Credits 4. 4 Lecture Hours.
Vector algebra and solid analytic geometry; calculus of functions of several variables; Lagrange multipliers; multiple integration, theory, methods and application; line and surface integrals, Green's and Stokes' theorems; Jacobians. Designed to be more demanding than MATH 251 and MATH 253. No credit will be given for more than one of MATH 221, MATH 251 and MATH 253.
Prerequisite: MATH 148, MATH 152, or MATH 172.

MATH 225 Advanced Spreadsheet Techniques
Credit 1. 1 Lecture Hour.
Advanced commands, formatting and functionality of spreadsheets, with Excel being the particular example.
Prerequisite: MATH or APMS major.

MATH 251 Engineering Mathematics III
Credits 3. 3 Lecture Hours.
Vector algebra, calculus of functions of several variables, partial derivatives, directional derivatives, gradient, multiple integration, line and surface integrals, Green's and Stokes' theorems. MATH 221 designed to be a more demanding version of this course. No credit will be given for more than one of MATH 221, MATH 251 and MATH 253.
Prerequisite: MATH 148, MATH 152, or MATH 172.

MATH 253 Engineering Mathematics III
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(MATH 2415) Engineering Mathematics III. Vector algebra; calculus of functions of several variables, partial derivatives, directional derivatives, gradient, multiple integration, line and surface integrals, Green's and Stokes' theorems, computer algebra. MATH 221 designed to be a more demanding version of this course. No credit will be given for more than one of MATH 221, MATH 251 and MATH 253.
Prerequisite: MATH 148, MATH 152, or MATH 172.

MATH 281 Seminar in Mathematics
Credit 1. 1 Lecture Hour.
Overview of different areas and topics of mathematics including logic, infinite sets, elements of topology, elements of history of mathematics; introduction to future courses in math degree plans and to some areas of research done by mathematics department faculty; topics may vary at the discretion of the instructor. 
Prerequisites: MATH and APMS majors; freshmen or sophomore classification; approval of instructor.

MATH and APMS majors; freshmen or sophomore classification; approval of instructor.
MATH 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems not covered by any other lower-division course in the curriculum; intended for freshman and sophomore students.
Prerequisite: Approval of department head.

MATH 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of mathematics. May be repeated for credit.
Prerequisite: Approval of instructor.

MATH 302 Discrete Mathematics
Credits 3. 3 Lecture Hours.
Formal structures for describing data, algorithms and computing devices; theory and applications of sets, graphs and algebraic structures.
Prerequisite: MATH 148, MATH 152, or MATH 172.

MATH 304 Linear Algebra
Credits 3. 3 Lecture Hours.
Introductory course in linear algebra covering abstract ideas of vector space and linear transformation as well as models and applications of these concepts, such as systems of linear equations, matrices and determinants. MATH 323 designed to be a more demanding version of this course. No credit will be given for more than one of MATH 304, MATH 309, MATH 311 and MATH 323.
Prerequisite: MATH 148, MATH 152 or MATH 172; junior or senior classification.

MATH 308 Differential Equations
Credits 3. 3 Lecture Hours.
Prerequisites: MATH 221, MATH 251, or MATH 253, or concurrent enrollment; knowledge of computer algebra system.

MATH 309 Linear Algebra for Differential Equations
Credits 3. 3 Lecture Hours.
Systems of linear equations, matrices, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, diagonalization, inner product spaces, orthogonal functions, separation of variables, Fourier series, Bessel functions. No credit will be given for more than one of MATH 304, MATH 309, MATH 311 and MATH 323.
Prerequisites: MATH 221, MATH 251, or MATH 253; MATH 308 or concurrent enrollment; junior or senior classification or approval of instructor.

MATH 311 Topics in Applied Mathematics I
Credits 3. 3 Lecture Hours.
Systems of linear equations, matrices, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, diagonalization, inner product spaces, orthogonal functions; vector analysis, including gradient, divergence, curl, line and surface integrals, Gausss’, Greens’ and Stokes’ theorems. No credit will be given for more than one of MATH 304, MATH 309, MATH 311 and MATH 323.
Prerequisites: MATH 221, MATH 251, or MATH 253; MATH 308 or concurrent enrollment; junior or senior classification or approval of instructor.

MATH 323 Linear Algebra
Credits 3. 3 Lecture Hours.
Linear equations and matrices; real vector spaces, linear transformations, change of bases, determinants, eigenvalues and eigenvectors, diagonalization, inner products. Designed to include more theory and be more demanding than MATH 304. No credit will be given for more than one of MATH 304, MATH 309, MATH 311 and MATH 323.
Prerequisites: MATH 148, MATH 152 or MATH 172; MATH 220; junior or senior classification or approval of instructor.

MATH 325 The Mathematics of Interest
Credits 3. 3 Lecture Hours.
The mathematical theory associated with interest; annuities; internal rate of return; coupon bonds; valuation of noncallable bonds; yield of maturity; interest rate sensitivity; duration and convexity; reinvestment risk; total return; compound return; STRIPS; yield curve; short selling; hedge ratio; bond swaps.
Prerequisites: MATH 142, MATH 147, MATH 151 or MATH 171.

MATH 365 Structure of Mathematics I
Credits 3. 3 Lecture Hours.
Informal logic, sets, relations, functions, whole numbers, numeration systems, binary operations, integers, elementary number theory, modular systems, rational numbers and the system of real numbers. Designed primarily for elementary teacher certification. Others must have consent of instructor.
Prerequisites: Must have completed University Core Curriculum mathematics requirements with a grade of C or better.

MATH 366 Structure of Mathematics II
Credits 3. 3 Lecture Hours.
Geometry, measurement and coordinate geometry. Designed primarily for elementary teacher certification. Others must have consent of instructor.
Prerequisite: MATH 365 or equivalent with a grade of C or better.

MATH 367 Basic Concepts of Geometry
Credits 3. 3 Lecture Hours.
Formal development of geometry: finite [Euclidean and non-Euclidean]. Designed primarily for elementary mathematics teacher certification. Others must have consent of instructor.
Prerequisite: MATH 366 or equivalent with a grade of C or better.

MATH 368 Introduction to Abstract Mathematical Structures
Credits 3. 3 Lecture Hours.
Mathematical proofs, sets, relations, functions, infinite cardinal numbers, algebraic structures, structure of the real line; designed primarily for elementary teacher certification.
Prerequisite: MATH 366 or equivalent with a grade of C or better.

MATH 375 Intermediate Real Analysis
Credits 3. 3 Lecture Hours.
Development of the real numbers, limits, foundations and major theorems of calculus. Designed primarily for mathematics teacher certification. Others must have consent of instructor.
Prerequisite: MATH 220 or equivalent.

MATH 376 Intermediate Abstract Algebra
Credits 3. 3 Lecture Hours.
Relations, functions, binary operators, rings, homomorphisms, integral domains and fields. Designed primarily for mathematics teacher certification. Others must have consent of instructor.
Prerequisites: MATH 220 or MATH 302; MATH 304 or equivalent.
MATH 396 Communications in Mathematics
Credit 1. 1 Lecture Hour.
Electronic, written, and oral communications in mathematics.
Prerequisite: MATH 220, junior or senior classification, and mathematics major.

MATH 401 Advanced Engineering Mathematics
Credits 3. 3 Lecture Hours.
Engineering mathematics including Perturbation Theory, Fourier series and partial differential equations. Designed primarily for engineering majors. Others must have consent of instructor.
Prerequisite: MATH 308.

MATH 403 Mathematics and Technology
Credits 3. 3 Lecture Hours.
Mathematical problem-solving and communication through the use of various technologies (both hardware and software). Intended primarily, but not limited to, students working toward teacher certification.
Prerequisite: MATH 367 or MATH 467 with a grade of C or better.

MATH 407 Complex Variables
Credits 3. 3 Lecture Hours.
Fundamental theory of analytic functions, including residues and their applications.
Prerequisite: MATH 221, MATH 251, or MATH 253.

MATH 409 Advanced Calculus I
Credits 3. 3 Lecture Hours.
Axioms of the real number system; point set theory of R1; compactness, completeness and connectedness; continuity and uniform continuity; sequences, series; theory of Riemann integration.
Prerequisites: MATH 220; MATH 221, MATH 251 or MATH 253.

MATH 410 Advanced Calculus II
Credits 3. 3 Lecture Hours.
Differential and integral calculus of functions defined on Rm including inverse and implicit function theorems and change of variable formulas for integration; uniform convergence.
Prerequisites: MATH 304 or MATH 323; MATH 409.

MATH 411 Mathematical Probability
Credits 3. 3 Lecture Hours.
Probability spaces, discrete and continuous random variables, special distributions, joint distributions, expectations, law of large numbers, the central limit theorem.
Prerequisite: MATH 148, MATH 152, or MATH 172.

MATH 412 Theory of Partial Differential Equations
Credits 3. 3 Lecture Hours.
Formulation and solution of partial differential equations of mathematical physics; Fourier series and transform methods, complex variable methods, methods of characteristics and first order equations.
Prerequisite: MATH 308 or approval of instructor.

MATH 414 Fourier Series and Wavelets
Credits 3. 3 Lecture Hours.
Fourier series and wavelets with applications to data compression and signal processing.
Prerequisite: MATH 304, MATH 309, MATH 311, or MATH 323.

MATH 415 Modern Algebra I
Credits 3. 3 Lecture Hours.
A study of groups, rings, fields with emphasis on the theoretical aspects and proofs.
Prerequisite: MATH 220; MATH 304 or MATH 323.

MATH 416 Modern Algebra II
Credits 3. 3 Lecture Hours.
Continuation of topics introduced in MATH 415 including Galois Theory and the Sylow Theorems with emphasis on the theoretical aspects.
Prerequisite: MATH 415; junior or senior classification.

MATH 417 Numerical Methods
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Numerical methods for applications; qualitative discussion of convergence and stability properties; computer implementation; interpolation and quadrature, initial value problems, matrix decompositions, interactive solution of linear and non-linear systems, least squares approximation, boundary value problems for ordinary differential equations.
Prerequisites: MATH 304, MATH 309, MATH 311, or MATH 323; MATH 308; ability to program; junior or senior classification.

MATH 419 Applications of Actuarial Science
Credits 2. 2 Lecture Hours.
Applications of actuarial science using mathematical and statistical methods to assess risk in the insurance and finance industries; emphasis on probability, statistics, finance and economics; focus on using probabilistic models in the estimation of insurance premiums.
Prerequisite: MATH 411 or STAT 414 or approval of math advisor.

MATH 420 Application of Actuarial Science II
Credits 2. 2 Lecture Hours.
Use of mathematical and statistical methods to price various financial instruments, such as bonds; understanding how the term structure of interest rates affect the price of these instruments.
Prerequisite: MATH 325 or concurrent enrollment, or approval of instructor.

MATH 423 Linear Algebra II
Credits 3. 3 Lecture Hours.
Eigenvalues, similarity and canonical forms, advanced topics to be chosen by the instructor.
Prerequisites: MATH 220 or CSCE 222/ECEN 222; MATH 304 or MATH 323, or approval of instructor.

MATH 425 The Mathematics of Contingent Claims
Credits 3. 3 Lecture Hours.
The mathematical theory associated with asset price dynamics; binomial pricing models; Black-Scholes analysis; hedging; volatility smile; implied volatility trees; implied binomial trees.
Prerequisites: MATH 308; MATH 411, STAT 211 or STAT 414.

MATH 427 Introduction to Number Theory
Credits 3. 3 Lecture Hours.
Prime and composite integers; Euclidean algorithm; modular arithmetic; Chinese remainder theorem; unique factorization; quadratic reciprocity; Riemann zeta function; representation of numbers as a sum of squares.
Prerequisites: MATH 220; MATH 304 or MATH 323.

MATH 431 Structures and Methods of Combinatorics
Credits 3. 3 Lecture Hours.
Enumerative techniques generating functions, partially ordered sets, elementary graph theory, elementary Ramsey theory.
Prerequisite: MATH 220 or MATH 302 or approval of instructor.

MATH 433 Applied Algebra
Credits 3. 3 Lecture Hours.
An introduction to groups, rings, fields with emphasis on modular arithmetic; applications to number theory, coding theory, and other areas.
Prerequisites: MATH 220 or MATH 302; MATH 304 or MATH 323.
MATH 436 Introduction to Topology
Credits 3. 3 Lecture Hours.
Metric spaces; continuity of metric spaces; topological spaces; basic notions; separation axioms; compactness; local compactness; connectedness; basic notions in homotopy theory; quotient spaces, paracompactness and topological manifolds.
Prerequisites: MATH 220; MATH 221, MATH 251, or MATH 253.

MATH 437 Principles of Numerical Analysis
Credits 4. 4 Lecture Hours. 3 Lab Hours.
Mathematical principles of numerical analysis and their application to the study of particular methods; fixed-point iteration, Newton’s method; normed vector spaces and operators, Schur decomposition, convergent matrices, minimization methods, conjugate gradient method; polynomial interpolation of Lagrange and Hermite; best approximation, Bernstein and Weierstrass Theorems, numerical quadrature.
Prerequisites: MATH 304, MATH 309, MATH 311, or MATH 323; MATH 308; MATH 409; ability to program; junior or senior classification.

MATH 439 Differential Geometry of Curves and Surfaces
Credits 3. 3 Lecture Hours.
Local and global theory of parameterized curves; regular surfaces, local coordinates, first fundamental form, orientation, area, Gauss map, second fundamental form; Gauss Bonnet theorem; additional topics to be selected by the instructor.
Prerequisites: MATH 308; MATH 304 or MATH 323.

MATH 442 Mathematical Modeling
Credits 3. 3 Lecture Hours.
The construction of mathematical models from areas such as economics, game theory, integer programming, mathematical biology and mathematical physics.
Prerequisites: MATH 304, MATH 309, MATH 311, or MATH 323; MATH 308 or equivalent.

MATH 446 Principles of Analysis I
Credits 3. 3 Lecture Hours.
Construction of the real and complex numbers; topology of metric spaces, compactness and connectedness; Cauchy sequences, completeness and the Baire Category Theorem; Continuous Mappings; introduction to Point-Set Topology.
Prerequisites: MATH 409; junior or senior classification.

MATH 447 Principles of Analysis II
Credits 3. 3 Lecture Hours.
Riemann-Stieltjes integration; sequences and series of functions; the Stone-Weierstrass and Arzela-Ascoli Theorems; introduction to Lebesgue measure theory and integration.
Prerequisites: MATH 446 or approval of instructor; junior or senior classification.

MATH 460 Tensors and General Relativity
Credits 3. 3 Lecture Hours.
Vectors and tensors in special relativity, curvature, manifolds, covariant differentiation, Einstein field equations, Schwarzschild geometry and black holes, cosmology, gauge field theories.
Prerequisites: MATH 308; PHYS 331 or MATH 323 or MATH 311; junior or senior classification.

MATH 467 Modern Geometry
Credits 3. 3 Lecture Hours.
Modern development of Euclidean geometry (Hilbert axioms) with historical and philosophical context; independence of the parallel postulate; models of hyperbolic non-Euclidean geometry.
Prerequisite: MATH 304, MATH 309, MATH 311, MATH 323 or MATH 220.

MATH 469 Introduction to Mathematical Biology
Credits 3. 3 Lecture Hours.
Introduction to mathematical modeling techniques in the biological sciences; continuous versus discrete models; deterministic versus stochastic models; includes population dynamics and ecology, spread of infectious diseases, population genetics and evolution, spatial pattern formation.
Prerequisites: MATH 304 or MATH 323; MATH 308 or equivalent.

MATH 470 Communications and Cryptography
Credits 3. 3 Lecture Hours.
Introduction to coded communications, digital signatures, secret sharing, one-way functions, authentication, error control and data compression.
Prerequisites: MATH 304 or MATH 309 or MATH 311 or MATH 323; CSCE 110 or CSCE 111 or CSCE 121 or CSCE 206 or ENGR 112; approval of instructor.

MATH 471 Introduction to Mathematical Biology II
Credits 3. 3 Lecture Hours.
Additional topics in coded communications; information and entropy, elliptical curves, error corrections, quantum methods.
Prerequisites: MATH 470 or consent of instructor.

MATH 482 Research Seminar
Credits 3. 3 Lecture Hours.
Problems, methods and recent developments in mathematics, with emphasis on projects, and written and oral presentations. May be repeated for credit.
Prerequisites: MATH 409 or MATH 415 (may be taken concurrently); junior or senior classification; approval of instructor.

MATH 485 Directed Studies
Credits 1 to 8. 3 to 8 Other Hours.
Special problems in mathematics not covered by any other course in the curriculum. Work may be in either theory or laboratory.
Prerequisite: Approval of department head.

MATH 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of mathematics. May be repeated for credit.
Prerequisite: Approval of instructor.

MATH 490 The Putnam Challenge
Credit 1. 1 Lecture Hour.
Intensive individualized training for preparation for the Putnam Exam, a national contest for mathematics majors. May be taken four times for credit.
Prerequisites: Approval of instructor; junior or senior classification.

MATH 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Active research of basic nature under supervision of Department of Mathematics or affiliated department graduate faculty member; a maximum of 6 hours of credit can be used in degree plans. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Mathematics or applied mathematical sciences major; junior or senior classification or approval of mathematics advisor.

MATH 492 Research Seminar
Credits 3. 3 Lecture Hours.
Open to graduate students in mathematics.
Prerequisites: Mathematics or applied mathematical sciences major; junior or senior classification or approval of mathematics advisor.

MATH 493 Research Project
Credits 0 to 3. 0 to 3 Other Hours.
Open to graduate students in mathematics.
Prerequisites: Mathematics or applied mathematical sciences major; junior or senior classification or approval of mathematics advisor.

MATH 494 Research Project
Credits 0 to 3. 0 to 3 Other Hours.
Open to graduate students in mathematics.
Prerequisites: Mathematics or applied mathematical sciences major; junior or senior classification or approval of mathematics advisor.

MATH 495 Research Project
Credits 0 to 3. 0 to 3 Other Hours.
Open to graduate students in mathematics.
Prerequisites: Mathematics or applied mathematical sciences major; junior or senior classification or approval of mathematics advisor.
MEEN 210 Geometric Modeling for Mechanical Design
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Foundations of geometric modeling as applied to mechanical design through use of modern computer-aided design (CAD) and physical prototyping tools; basics of systematic design methodology; geometric visualization concepts: multiview orthographic, isometric, oblique, perspective; three-dimensional representations, surface and solid modeling; dimensioning and tolerancing; rapid prototyping using 3D printing.
Prerequisites: Mechanical engineering major; ENGR 111.

MEEN 221 Statics and Particle Dynamics
Credits 3. 3 Lecture Hours.
Application of the fundamental principles of Newtonian mechanics to the statics and dynamics of particles; equilibrium of trusses, frames, beams and other rigid bodies.
Prerequisites: For non-mechanical engineering majors; admission to an engineering major; MATH 251 or MATH 253 or registration therein; PHYS 218.

MEEN 222/MSEN 222 Materials Science
Credits 3. 3 Lecture Hours.
Mechanical, optical, thermal, magnetic and electrical properties of solids; differences in properties of metals, polymers, ceramics and composite materials in terms of bonding and crystal structure.
Prerequisites: CHEM 102, or CHEM 104 and CHEM 114, or CHEM 107 and CHEM 117; PHYS 218.
Cross Listing: MSEN 222/MEEN 222.

MEEN 225 Engineering Mechanics
Credits 3. 3 Lecture Hours.
Application of the laws of classical mechanics to simplified, plausibly real world problems or interest to mechanical engineering, including the analysis of cables, frames, trusses, beams, machines and mechanisms.
Prerequisites: Mechanical engineering major; MATH 251 or MATH 253 or registration therein; PHYS 218.

MEEN 260 Mechanical Measurements
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to the basic principles of engineering experimentation including: instrumentation and measurement techniques, signal processing and data acquisition, statistical data analysis, and interpretation and reporting of results.
Prerequisites: MEEN 225, ECEN 215, MATH 308 and MEEN 315 or registration therein.

MEEN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed studies in specific problem areas of mechanical engineering.
Prerequisites: MEEN classification; approval by instructor and department head or delegate.

MEEN 289 Special Topics in...
Credits 0 to 4. 0 to 4 Other Hours.
Selected topics in an identified area of mechanical engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

MEEN 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in mechanical engineering. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

MEEN 315 Principles of Thermodynamics
Credits 3. 3 Lecture Hours.
Theory and application of energy methods in engineering; conservation of mass and energy; energy transfer by heat, work and mass; thermodynamic properties; analysis of open and closed systems; the second law of thermodynamics and entropy; gas, vapor and refrigeration cycles.
Prerequisites: MEEN 225; MATH 251 or MATH 253; junior or senior classification.

MEEN 344 Fluid Mechanics
Credits 3. 3 Lecture Hours.
Application of laws of statics, buoyancy, stability, energy and momentum to behavior of ideal and real fluids; dimensional analysis and similitude and their application to flow through ducts and piping; lift and drag and related problems.
Prerequisites: MEEN 225 and MEEN 315.

MEEN 345 Fluid Mechanics Laboratory
Credit 1. 3 Lab Hours.
Introduction to basic fluid mechanics instrumentation; experimental verification and reinforcement of the analytical concepts introduced in MEEN 344.
Prerequisites: MEEN 260; MEEN 344 or registration therein.

MEEN 357 Engineering Analysis for Mechanical Engineers
Credits 3. 3 Lecture Hours.
Practical foundation for the use of numerical methods to solve engineering problems: Introduction to Matlab, error estimation, Taylor series, solution of non-linear algebraic equations and linear simultaneous equations; numerical integration and differentiation; initial value and boundary value problems; finite difference methods for parabolic and elliptic partial differential equations.
Prerequisites: ENGR 112 and MATH 308; MEEN 210 or concurrent enrollment.

MEEN 360 Materials and Manufacturing Selection in Design
Credits 3. 3 Lecture Hours.
Selecting materials and manufacturing processes in design; emphasis on material mechanical properties; microstructure production and control; manufacturing processes for producing various shapes for components and structures; use of design methodology.
Prerequisites: MEEN 210, MEEN 222/MSEN 222, MEEN 260; CVEN 305; junior or senior classification.

MEEN 361 Materials and Manufacturing in Design Laboratory
Credit 1. 3 Lab Hours.
Experiments in materials characterization and manufacturing processes; emphasis on material mechanical properties; microstructure production and control; manufacturing processes for producing various shapes for components and structures.
Prerequisites: MEEN 222/MSEN 222, MEEN 260; CVEN 305; MEEN 360 or registration therein; junior or senior classification or approval of instructor.
MEEN 363 Dynamics and Vibrations  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Dynamics and Vibration. Application of Newtonian and energy methods to model dynamic systems (particles and rigid bodies) with ordinary differential equations; solution of models using analytical and numerical approaches; interpreting solutions; linear vibrations. 
Prerequisites: MEEN 225; MATH 308; MEEN 357 or concurrent enrollment; CVEN 305 or concurrent enrollment. 

MEEN 364 Dynamic Systems and Controls  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Mathematical modeling, analysis, measurement and control of dynamic systems; extensions of modeling techniques of MEEN 363 to other types of dynamic systems; introduction to feedback control, time and frequency domain analysis of control systems, stability, PID control, root locus; design and implementation of computer-based controllers in the lab.  
Prerequisites: MEEN 260 and MEEN 363; ECEN 215. 

MEEN 368 Solid Mechanics in Mechanical Design  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Stress analysis of deformable bodies and mechanical elements; stress transformation; combined loading; failure modes; material failure theories; fracture and fatigue; deflections and instabilities; thick cylinders; curved beams; design of structural/mechanical members; design processes.  
Prerequisites: CVEN 305; MEEN 357 and MEEN 360 or registration therein; junior or senior classification. 

MEEN 381 Seminar  
Credit 1. 2 Other Hours. 
Presentations by practicing engineers and faculty addressing: effective communications, engineering practices, professional registration, ethics, career-long competence, contemporary issues, impact of technology on society and being informed; preparation of a resume, a lifelong learning plan, two papers, two oral presentations and complete an online assessment of the mechanical engineering program.  
Prerequisite: Upper-level classification in mechanical engineering. 

MEEN 399 High Impact Experience for Mechanical Engineers  
Credits 0. 0 Other Hours.  
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.  
Prerequisite: Junior or senior classification. 

MEEN 401 Introduction to Mechanical Engineering Design  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
The design innovation process; need definition, functional analysis, performance requirements and evaluation criteria, conceptual design evaluation, down-selected to an embodiment; introduction to systems and concurrent engineering; parametric and risk analysis, failure mode analysis, material selection, and manufacturability; cost and life cycle issues, project management.  
Prerequisites: MEEN 360, MEEN 361, MEEN 364, MEEN 368, MEEN 461. 

MEEN 402 Intermediate Design  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Product detail design and development process including case studies; project management, marketing considerations, manufacturing, detailed design specifications; failure modes, application of codes and standards, selection of design margins; product (component) development guidelines; intellectual property, product liability and ethical responsibility.  
Prerequisites: MEEN 401; junior or senior classification. 

MEEN 404 Engineering Laboratory  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Systematic design of experimental investigations; student teams identify topics and develop experiment designs including: establishing the need; functional decomposition; requirements; conducting the experiment; analyzing and interpreting the results and written and oral reports documenting the objectives, procedure, analysis, and results and conclusion of two or three experiments.  
Prerequisites: MEEN 260, MEEN 360, MEEN 361, MEEN 364 and MEEN 461; MEEN 401 or registration therein; junior or senior classification. 

MEEN 408 Introduction to Robotics  
Credits 3. 3 Lecture Hours.  
Forward and inverse kinematics of robot manipulators, path planning, motion planning for mobile robots, dynamics of robot manipulators, control algorithms; computed torque algorithm, adaptive control algorithms and current topics in mobile robots; cooperative motion planning of mobile robots and formation control.  
Prerequisites: MEEN 364 or equivalent; junior or senior classification. 

MEEN 410 Internal Combustion Engines  
Credits 3. 3 Lecture Hours.  
Thermodynamics of cycles for internal combustion engines and gas turbines, including fuels and combustion; performance characteristics of various types of engines.  
Prerequisite: MEEN 344 or equivalent or approval of instructor. 

MEEN 411 Mechanical Controls  
Credits 3. 3 Lecture Hours. 
Application of classical and modern control theory techniques to modeling, analysis and synthesis of linear, mechanical control systems.  
Prerequisite: MEEN 364. 

MEEN 414 Principles of Turbomachinery  
Credits 3. 3 Lecture Hours.  
Aero-thermodynamic and mechanical design of turbomachinery components including steam and gas turbine stages, compressor stages, and inlet and exhaust systems, and their integration into power and thrust generation units; design and off-design behaviors of turbine and compressor stages and units; design with SolidWorks.  
Prerequisites: MEEN 421 or approval of instructor; junior or senior classification. 

MEEN 417/NUEN 417 Basics of Plasma Engineering and Applications  
Credits 3. 3 Lecture Hours.  
Basic plasma properties and confinement techniques; single particle orbits in electric and magnetic fields, moments of Boltzmann equation and introduction to fluid theory; wave phenomena in plasmas and introduction to plasma kinetic theory; analysis of laboratory plasmas and plasma applications including fusion, electric propulsion, materials processing and plasmas enhanced chemistry.  
Prerequisites: PHYS 208 or equivalent; senior classification in nuclear, mechanical or aerospace engineering, physics, or approval of instructor.  
Cross Listing: NUEN 417/MEEN 417.
MEEN 421 Thermal-Fluids Analysis and Design
Credits 3. 3 Lecture Hours.
Integration of thermodynamics, fluid mechanics and heat transfer through application to the design of various thermal systems comprised of several components requiring individual analyses; analysis of the entire system; representative applications of thermal-fluids analysis with a design approach.
Prerequisites: MEEN 461; MEEN 315; junior or senior classification.

MEEN 430 Nanomaterials
Credits 3. 3 Lecture Hours.
Fundamentals of nanotechnology, including nanomaterials, types of nanomaterials, fabrication, characterization methods, and applications; explore current roles in technology and future impact on such systems on industry.
Prerequisites: Junior or senior classification and approval of instructor.

MEEN 431 Advanced System Dynamics and Controls
Credits 3. 3 Lecture Hours.
Unified framework for modeling, analysis, synthesis, design and simulation of mechanical systems with energy exchange across multiple domains; study of mechanical, electrical, hydraulic and thermal subsystems; Newtonian mechanics, rigid body dynamics, multiple degrees of freedom vibrations and control system design.
Prerequisites: MEEN 364; junior or senior classification.

MEEN 432 Automotive Engineering
Credits 3. 3 Lecture Hours.
Introduction to vehicle dynamics; application of engineering mechanics principles to analysis of acceleration and braking, cornering and handling; analysis and design of drive train, suspension, brakes, and tires to achieve desired performance.
Prerequisite: MEEN 363.

MEEN 433 Mechatronics
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Basic principles of digital logic and analog circuits in mechanical systems; electrical-mechanical interfacing; sensors and actuators; digital control implementation; precision design and system integration.
Prerequisite: MEEN 364 or equivalent.

MEEN 434 Dynamics and Modeling of Mechatronic System
Credits 3. 3 Lecture Hours.
Mechatronic interactions in lumped parameter and continuum systems; review of integral and differential electromagnetic laws, including motions; lumped elements and dynamic equations of motion; linear and nonlinear actuators and transducers; field transformation and moving media; electromagnetic force densities and stress tensors.
Prerequisite: MEEN 364.

MEEN 436 Principles of Heating, Ventilating and Air Conditioning
Credits 3. 3 Lecture Hours.
Application of thermodynamics fluid mechanics, and heat transfer to the design of HVAC equipment; selection of equipment, piping and duct layouts.
Prerequisite: MEEN 461 or equivalent.

MEEN 437 Principles of Building Energy Analysis
Credits 3. 3 Lecture Hours.
Analysis of building energy use by applying thermodynamics and heat transfer to building heating and cooling load calculations; heat balance and radiant time series calculation methods; psychrometric analysis, indoor air quality, effect of solar radiation on heating and cooling of buildings. Required design project.
Prerequisites: MEEN 315 or equivalent; junior or senior classification.

MEEN 439 Solar Energy Engineering
Credits 3. 3 Lecture Hours.
Solar energy; solar angles and radiation; solar thermal systems; solar water heating and space heating; concentrated solar power; energy storage; solar photovoltaics; solar cell manufacturing; other solar energy technologies.
Prerequisite: MEEN 315.

MEEN 440 Bio-inspired Engineering Design
Credits 3. 3 Lecture Hours.
Expand design space available to engineering by developing and understanding of how nature solves problems; study of effective bio-inspired design and biomimetic applications to draw solutions from nature; enhance concept generation through the use of bio-inspired design; use current state of the art methods in bioinspired design; view nature’s solutions to different problems form an engineering perspective.
Prerequisite: MEEN 368, BMEN 361, or BAEN 375.

MEEN 441 Design of Mechanical Components and Systems
Credits 3. 3 Lecture Hours.
Design of machine elements, characteristics of prime movers, loads and power transmission elements as related to mechanical engineering design.
Prerequisite: MEEN 368 or approval of instructor.

MEEN 442 Computer Aided Engineering
Credits 3. 3 Lecture Hours.
Effective and efficient use of modern computer hardware and software in modeling, design, and manufacturing; simulation of a broad spectrum of mechanical engineering problems.
Prerequisites: MEEN 363 and MEEN 368.

MEEN 444 Finite Element Analysis in Mechanical Engineering
Credits 3. 3 Lecture Hours.
Introduction to basic theory and techniques; one- and two-dimensional formulations for solid mechanics applications; direct and general approaches; broader aspects for field problems; element equations, assembly and solution schemes; computer implementation, programming and projects; error sources and application consideration.
Prerequisites: MEEN 357 and 368 or equivalents.

MEEN 445 Engineering Applications of Solid Mechanics
Credits 3. 3 Lecture Hours.
Mechanical and mathematical basis for modeling response of solid bodies undergoing coupled mechanical and non-mechanical effects, analysis of stress and deformation for structural members subjected to axial, torsional and bending loads, design of multifunctional systems.
Prerequisites: CVEN 305, MEEN 368.

MEEN 451 Viscoelastic Materials
Credits 3. 3 Lecture Hours.
Mechanical and mathematical basis for modeling linear viscoelastic materials which focus on polymeric solid materials; characterization of viscoelastic material properties from experimental tests; applications of stress and deformation relationships for viscoelastic structural members subjected to axial, torsional, and bending loads.
Prerequisites: CVEN 305; junior or senior classification.

MEEN 454 Tribology
Credits 3. 3 Lecture Hours.
History and significance of tribology, rough surfaces, hertzian contact, rough surfaces in contact, friction of surfaces in contact, surface failures/wear, boundary lubrication, fluid properties, thick film lubrication, thin film lubrication, micro- and nano-tribology.
Prerequisites: Grade of C or better in MEEN 344 and MEEN 368.
MEEN 455 Engineering with Plastics
Credits 3. 3 Lecture Hours.
Polymer structure, processing, property characterization at the molecular, microscopic and macroscopic dimensional levels for thermosets, thermoplastics, elastomers, fibers and advanced fibrous nonparticle filled composites and smart multi-performance structures.
Prerequisite: MEEN 222/MSEN 222 or approval of instructor.

MEEN 458 Processing and Characterization of Polymers
Credits 3. 3 Lecture Hours.
Introduction of flow behavior in polymers; structure-property-process relationship; mixing rules for polymer blends; mechanical properties; laboratory demonstrations: injection molding, extrusion, melt mixing, and study of morphology using OM, SEM, and TEM.
Prerequisite: MEEN 222/MSEN 222.

MEEN 459 Sound and Vibration Measurements
Credits 3. 3 Lecture Hours.
Basic acoustics, review of vibration theory, wave propagation in vibrating systems, sound radiation from vibrating systems, sound and vibration sensors and instrumentation, data acquisition systems, measurement techniques, spectral analysis, spatial FFT analysis, design of experiments with vibro-acoustic systems, applications.
Prerequisites: MEEN 363; MATH 308.

MEEN 460 Corrosion Engineering
Credits 3. 3 Lecture Hours.
Basic corrosion phenomena are described, including mixed potential theory, types of corrosion, experimental methods, and prevention techniques.
Prerequisite: MEEN 360 and MEEN 361, or equivalent.

MEEN 461 Heat Transfer
Credits 3. 3 Lecture Hours.
Heat transfer by conduction, convection and radiation: steady and transient conduction, forced and natural convection, and blackbody and gray body radiation; multi-mode heat transfer; boiling and condensation; heat exchangers.
Prerequisites: MEEN 344; MATH 308.

MEEN 463 Cogeneration Systems
Credits 3. 3 Lecture Hours.
Design and analysis of cogeneration system; selection of the prime mover, matching power and thermal needs, institutional factors, economic evaluations, financial options and the study of actual and hypothetical systems..
Prerequisite: MEEN 421 or equivalent.

MEEN 464 Heat Transfer Laboratory
Credit 1. 3 Lab Hours.
Basic measurement techniques in conduction, convection, and radiation heat transfer; experimental verification of theoretical and semi-empirical results; uncertainty analysis.
Prerequisite: MEEN 345, MEEN 461 or registration therein.

MEEN 467 Mechanical Behavior of Materials
Credits 3. 3 Lecture Hours.
Fundamentals of flow and fracture in metals, emphasizing safe design by anticipating response of materials to complex stress and environmental service conditions; micromechanisms of flow, fatigue, creep and fracture; fracture mechanics approach to design. Special emphasis given to microstructure-mechanical property relationship and damage tolerant design.
Prerequisite: MEEN 360 and MEEN 361.

MEEN 469 Alternative Energy Conversion
Credits 3. 3 Lecture Hours.
Design and analysis of alternative energy conversion processes and systems that are based on converting energy directly (e.g., fuel cells, photovoltaics), utilizing non-combustible heat sources (e.g., geothermal, ocean gradients, solar and nuclear fission and fusion) and obtaining energy from the environment (e.g., wind, hydroelectric, ocean tides and waves).
Prerequisite: MEEN 315.

MEEN 471 Elements of Composite Materials
Credits 3. 3 Lecture Hours.
Fundamentals concerned with relating structure of multiphase materials to physical properties; plastic, metallic and ceramic matrices reinforced with continuous and discontinuous fibers, whiskers and particulates.
Prerequisites: MEEN 360, MEEN 361, and MEEN 368 or approval of instructor.

MEEN 472 Gas Dynamics
Credits 3. 3 Lecture Hours.
Fundamental analysis of compressible flows and its application to supersonic airfoils/projectiles, jet and rocket nozzles, normal and oblique shock waves, explosion waves, shock tubes, supersonic wind tunnels, and compressible pipe flows.
Prerequisite: MEEN 344.

MEEN 475 Materials in Design
Credits 3. 3 Lecture Hours.
The heuristics of synthesis of material properties, configuration and processing in the optimization of material selection in the design process; product design and development overview, failure mode effects analysis, design margin establishment; role of the generic failure modes and codes and standards; fundamental characteristics of process methods.
Prerequisites: MEEN 360 and MEEN 361; CVEN 305.

MEEN 476 Nanoscale Issues in Manufacturing
Credits 3. 3 Lecture Hours.
Fundamentals of manufacturing techniques at the nanoscale and larger length scales; design approaches and issues; direct fabrication of nanostructures; nanomanufacturing as a building block to larger objects; fabrication of composites and devices utilizing nanoscale components.
Prerequisites: MEEN 222/MSEN 222 or approval of instructor; junior or senior classification.

MEEN 477 Air Pollution Engineering
Credits 3. 3 Lecture Hours.
Design of air pollution abatement equipment and systems to include cyclones, bag filters, and scrubbers; air pollution regulations; permitting; dispersion modeling; National Ambient Air Quality Standards.
Prerequisite: ENGR 214 or equivalent.
Cross Listing: BAEN 477 and SENG 477.

MEEN 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Special problems relating to a specific project in some phase of mechanical engineering. A commitment of two semesters with 6 hours 485 credit is required.
Prerequisites: Approval of department head and senior classification.

MEEN 489 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in an identified area of mechanical engineering.
Prerequisite: Approval of instructor.
MEEN 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in mechanical engineering. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

MEFB - Mid Grds Ed Field Based (MEFB)

MEFB 351 Introduction to Middle Grades: Adolescent Development, Philosophy and Organization
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Study of young adolescents in domains of physical, social, emotional, cognitive, interpersonal, moral growth and development; organizational structure of middle schools supporting development of young adolescents through teaming and interdisciplinary work; investigates roles and responsibilities of middle level teachers.
Prerequisite: Junior classification.
Corequisites: MASC 351 and MASC 450; admission to teacher education; senior classification.

MEFB 450 Social Studies Methods in the Middle Grades
Credits 3. 2 Lecture Hours. 6 Other Hours.
Trends and issues related to middle grades curriculum development and instruction in social studies and humanities; integration of content, planning, teaching-learning experiences; evaluation of teaching and learning in social studies.
Prerequisites: MEFB 352; admission to teacher education; senior classification.

MEFB 452 Curriculum and Instruction for Middle Grades
Credits 3. 2 Lecture Hours. 6 Other Hours.
Study of educational theory and instructional strategies appropriate to middle grades education including planning and development of interdisciplinary and multidisciplinary curricula; student centered learning and methodologies.
Prerequisites: Admission to teacher education; senior classification.

MEFB 460 Math Methods in Middle Grades
Credits 3. 2 Lecture Hours. 6 Other Hours.
Examines theories, provides practice in teaching methods essential to successful mathematics learning; focuses on content and criteria central to teaching mathematics for understanding, skill development, and problem solving; readings, discussions, analyses; modeling and practicing mathematics teaching and learning.
Prerequisites: MASC 351 and MASC 450; admission to teacher education; senior classification.
Corequisites: MEFB 452, MEFB 470, RDNG 490.

MEFB 465 Science Methods in Middle Grades
Credits 3. 2 Lecture Hours. 6 Other Hours.
Problems-based-learning course integrating science content, scientific inquiry skills and field-based instruction; technology-mediated teaching, learning, and assessment.
Prerequisites: MEFB 352; admission to teacher education; senior classification.
Corequisites: MEFB 460; MASC 450.

MEFB 497 Supervised Clinical Teaching
Credits 6. 30 Other Hours.
Culmination of teaching education program; integrate and apply knowledge and skills learned from program of study while observing and participating in accredited schools with university supervision. Must be taken on a satisfactory/ unsatisfactory basis.
Prerequisites: Admission and retention in teacher education program; successful completion of all coursework.

MEPS-Molecular & Env Plant Sci (MEPS)

MEPS 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in molecular and environmental plant sciences. May be repeated 3 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

MEPS 313 Introduction to Plant Physiology
Credits 3. 3 Lecture Hours.
General course dealing with principal life processes of higher plants; influence of environmental factors on these processes. Agricultural and ecological significance of life processes of plants.
Prerequisites: BIOL 101; CHEM 102 or CHEM 104; CHEM 222 or CHEM 228.

MEPS 316 Introduction to Theory and Practice of Plant Physiology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Theory of plant physiology related to purposeful practices for improving plant adaptation, productivity and quality and for protecting and remediating environments in agriculture; laboratory experiments of physiology of plant structure, components and culture; water relations and stress; nitrogen and mineral nutrition; gas exchange; hormonal regulation.
Prerequisites: BIOL 101; CHEM 101; junior or senior classification.

MEPS 411/GENE 411 Biotechnology for Crop Improvement
Credits 3. 3 Lecture Hours.
Use of biotechnology to improve agricultural, horticultural and forest crops; techniques and methods used and case studies where biotechnology has been used to alter traits such as pathogen resistance, protein or oil consumption, ripening, fertility and wood properties.
Prerequisite: BIOL 113 or equivalent.
Cross Listing: GENE 411/MEPS 411.

MEPS 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual problems or research not covered by other coursework. Report required.
Prerequisites: Junior or senior classification and prior approval of instructor or department head.

MEPS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of plant physiology. May be repeated for credit.
MEPS 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in molecular and environmental plant sciences. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

METR - Meteorology (METR)

METR 302 Weather Reports and Forecasting
Credits 3. 3 Lecture Hours.
Weather and Reports Forecasting. Basic description of atmospheric characteristics and processes relevant to the understanding of weather patterns and atmospheric principles.
Prerequisite: Junior or senior classification or approval of instructor.

MGMT - Management (MGMT)

MGMT 105 Introduction to Business
Credits 3. 3 Lecture Hours.
(BUSI 1301) Introduction to Business. Survey of economic systems, forms of business ownership and running the small business; organizing and managing businesses; managing human resources; managing production and information; managing marketing; introducing financial issues including accounting, money, and banking, securities markets; business issues and challenges including legal and regulatory environment, business ethics, and international business. Limited to students in freshman or sophomore classification.

MGMT 209 Business, Government and Society
Credits 3. 3 Lecture Hours.
Impact of the external environment-legal, political, economic and international-on business behavior; market and non-market solutions to contemporary public policies confronting business persons examined including antitrust law, employment and discrimination law, product safety regulation, consumer protection and ethics. May not be used to satisfy degree requirements for majors in business.
Prerequisites: Sophomore classification; for students other than business and agribusiness majors.

MGMT 211 Legal and Social Environment of Business
Credits 3. 3 Lecture Hours.
Role of government in business and society; analysis of social policy and legal institutions; ethical problems in management decisions; administrative law; antitrust law; employment and discrimination law; regulation of business transactions; protection of property rights; regulation of information in markets including securities and product safety; international business law.
Prerequisite: Sophomore classification.

MGMT 212 Business Law
Credits 3. 3 Lecture Hours.
(BUSI 2301) Business Law. Legal principles of business; legal reasoning; dispute resolution and procedure; contract law; bankruptcy law; property law; Uniform Commercial Codes sections concerning contracts, security interests, negotiable instruments and sales.
Prerequisite: Sophomore classification.

MGMT 261 Introduction to Entrepreneurship
Credit 1. 1 Lecture Hour.
Exposure to the mindset of entrepreneurship through interaction with successful entrepreneurs and hands-on activities for exploring the 21st century global entrepreneurial economy. May be taken two times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Freshman classification in the Startup Living Learning Community.

MGMT 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of business and management. May be repeated for credit.
Prerequisite: Approval of instructor.

MGMT 309 Survey of Management
Credits 3. 3 Lecture Hours.
Survey for non-business majors of the basic functions and responsibilities of managers; includes the environmental context of management, planning and decision making, organization structure and design, leading and managing people, and the controlling process; issues of globalization, ethics, quality and diversity integrated throughout the course. May not be used to satisfy degree requirements for majors in business.
Prerequisites: Junior classification; for students other than business and agribusiness majors.

MGMT 363 Managing People in Organizations
Credits 3. 3 Lecture Hours.
The role and importance of human behavior in organizations; models for understanding individual, group, and team dynamics, including individual differences, motivation, and leadership; managing organizational change; ethical issues in organizations; cross-cultural issues in managing people in organizations; the organizational context as determined by human resource management and organization design.
Prerequisite: MGMT 211 and admission to upper division in Mays Business School.

MGMT 372 Advanced Concepts in Organizational Behavior
Credits 3. 3 Lecture Hours.
Builds on the survey of organizational behavior in MGMT 363; review of core concepts and their application in organizational settings; includes personality and individual differences, job design, group and team dynamics, leadership and decision-making, conflict and cooperation, cross-cultural aspects of behavior in organizations.
Prerequisite: MGMT 363.

MGMT 373 Managing Human Resources
Credits 3. 3 Lecture Hours.
Strategic issues in managing human resources; shared responsibilities of line managers and human resource staff for developing and implementing human resource policies and procedures; human resource planning; job design, analysis and evaluation; staffing; compensation; performance appraisal; training and development; career management; labor relations; legal, ethical and international issues.
Prerequisite: MGMT 363.

MGMT 376 Entrepreneurial Perspectives
Credits 3. 3 Lecture Hours.
Entrepreneurship as a career choice and its impact on society and economy; definitions of entrepreneurship; discovery of entrepreneurial opportunities and start-up funding; innovation and entrepreneurship theories for analyzing and predicting success of start-up and established entrepreneurial organizations.
Prerequisite: Admission to upper division in Mays Business School.
MGMT 422 Management Consulting
Credits 3.3 Lecture Hours.
The field of management consulting from the perspective of both the individual consultant and the consulting firm; fundamentals of diagnosing situations, planning and executing assignments, client management, common mistakes and ethical issues in consulting, including a variety of diagnostic and problem-solving methodologies.
Prerequisite: MGMT 363.

MGMT 424 Organizational Design, Change and Development
Credits 3.3 Lecture Hours.
Aspects of effectively planning for and introducing changes in organizational structures and procedures based on environmental demands; examination of the successful management of organizational and behavioral changes, focusing on planned and unplanned changes, and emphasizing development of change strategies and measurement of change effectiveness.
Prerequisite: MGMT 363.

MGMT 425 Human Resource Selection
Credits 3.3 Lecture Hours.
Theory and application of methods for the recruitment and selection of managerial, non-professional and professional employees; exposure to scientific issues such as reliability and validity, legal issues such as equal opportunity and affirmative action, and selection techniques such as interviews and testing.
Prerequisite: MGMT 373.

MGMT 427 Human Resource Compensation
Credits 3.3 Lecture Hours.
Theories and techniques of designing and managing programs of direct compensation and benefits, including the role of rewards in motivation, job evaluation, pay discrimination and comparable worth, internal and external equity comparisons and benefit plans.
Prerequisite: MGMT 373.

MGMT 429 Labor and Industry
Credits 3.3 Lecture Hours.
Brief review of the history of organized labor; critical study of labor-management relations; analysis of fundamentals of labor contracts and administration of contract parts.
Prerequisite: Admission to upper division in Mays Business School.

MGMT 430/WGST 430 Employment Discrimination Law
Credits 3.3 Lecture Hours.
Legal issues surrounding employment discrimination, including disparate treatment and impact; intent; affirmative action; sexual harassment; pregnancy, sex, race, religious, salary, disability, age, and ethnic discrimination; policy issues and perspectives to aid human resource specialists and managers.
Prerequisites: Admission to upper division in Mays Business School and senior classification.
Cross Listing: WGST 430/MGMT 430.

MGMT 432 Managing the Nonprofit Organization
Credits 3.3 Lecture Hours.
Broad trends shaping the nonprofit sector, a primary driver of social change and key player in society and the economy that provides an array of goods and services; complex management challenges that confront nonprofits as they balance their mission and values against the requirements of effective management with limited resources.
Prerequisite: MGMT 363.

MGMT 435 Labor Law and Policy
Credits 3.3 Lecture Hours.
Federal and state public policy and laws regulating human resource management including National Labor Relations Act, Railway Labor Act, Fair Labor Standards Act, employment discrimination statutes, statutes regarding public sector unionization, and other relevant legal authorities; various forms of dispute settlement including litigation, mediation, fact finding and arbitration; legal ramifications of strategic human resource management decision making.
Prerequisites: Admission to upper division in Mays Business School and senior classification.

MGMT 439 Negotiations
Credits 3.3 Lecture Hours.
Overview of the various theories and processes of negotiation relevant to the broad spectrum of negotiation problems faced by employees and managers, and in situations outside of organizations; discovery of optimal solutions to problems and means to implement solutions through classroom simulations, role playing and case studies.
Prerequisite: MGMT 363.

MGMT 440 Creativity and Innovation in Business
Credits 3.3 Lecture Hours.
Examines factors that may foster or stifle individual, team, organizational creative performance; presents techniques that may improve creative thinking skills.
Prerequisite: MGMT 363.

MGMT 450/IBUS 450 International Environment of Business
Credits 3.3 Lecture Hours.
Broad survey of international business issues; analyzes the environment in which international businesses operate; examines international economic issues including trade theory, investment theory, foreign exchange and capital markets, and balance of payments; introduces multinational enterprises, global competition, international organizations, treaties and international law, national trade policies and the determinants of competitiveness of firms in international markets.
Prerequisite: Admission to upper division in Mays Business School.
Cross Listing: IBUS 450/MGMT 450.

MGMT 452/IBUS 452 International Management
Credits 3.3 Lecture Hours.
An overview of international management to include international dimensions of organizational behavior, theory, strategy and human resource management; application of theoretical ideas to real-world situations through case analyses, presentations, projects and interactive class discussion.
Prerequisite: MGMT 450/IBUS 450 or IBUS 450/MGMT 450, or concurrent enrollment.
Cross Listing: IBUS 452/MGMT 452.

MGMT 453/IBUS 453 Emerging Economies: Brazil, Russia, India, China
Credits 3.3 Lecture Hours.
Examination of present and future dynamics of the emerging economies of Brazil, Russia, India and China and their impact on the developing and developed worlds; importance of BRIC countries and their position in the world; history and development of these countries and the current business environment in each.
Prerequisite: MGMT 363.
Cross Listing: IBUS 453/MGMT 453.
MGMT 457/IBUS 457 Global Entrepreneurship
Credits 3.3 Lecture Hours.
Practical issues associated with taking small- and medium-size business global; includes importing and exporting, developing global strategies, evaluating market opportunities, regional impact on economies and people.
Prerequisite: Admission to upper division in Mays Business School.
Cross Listing: IBUS 457/MGMT 457.

MGMT 460 Managing Projects
Credits 3.3 Lecture Hours.
Application of management processes to complex interdisciplinary organizational environments through the study of program and project management; adoptions of traditional management theories to the project environment; master typical project management microcomputer software for project planning; resource allocation; project budgeting; and control of project cost, schedule and performance.
Prerequisite: MGMT 363.

MGMT 461 Entrepreneurship and New Ventures
Credits 3.3 Lecture Hours.
The entrepreneurial process from conception of a business idea to the actual start up of the venture; environmental scanning for new opportunities; matching individual skills and attributes with the requirements of the venture; evaluating the viability, growth potential and markets for the venture; securing financing; beginning operations.
Prerequisites: Admission to upper division in Mays Business School and senior classification.

MGMT 464 The Political Environment of Business
Credits 3.3 Lecture Hours.
Role of business in contemporary society; the large corporation and its external environment; ownership and control controversy; private and collective choice processes; role of regulation; social issues including pollution, discrimination, consumer protection, corporate social and ethical responsibilities, corporate political activity; international business relations.
Prerequisites: MGMT 363 and senior classification.

MGMT 465 Corporate Governance
Credits 3.3 Lecture Hours.
Overview of the theories and practice of corporate governance; history of corporations, role and relationship of boards of directors, shareholders and management; concepts of agency cost, shareholder activism, executive compensation and international corporate governance in globalized markets; ethical issues and corporate social responsibility.
Prerequisite MGMT 363.

MGMT 466 Strategic Management
Credits 3.3 Lecture Hours.
Strategic issues facing organizations, including top management decision making and social responsibility; environmental and industry analysis; establishing organizational mission and objectives; corporate, business and functional level strategy formulation; global and multidomestic strategies; strategic implementation and control; integrating operations, finance, marketing and human resource strategies; case analysis.
Prerequisites: MGMT 363; FINC 341; SCMT 364; MKTG 321; senior classification.

MGMT 470 Entrepreneurial Small Business
Credits 3.3 Lecture Hours.
Exploration of practical approaches to growing a small business, evaluating and projecting financial performance, raising capital, legal formations and issues, human resource management, business plan development, franchising and family business; networking opportunities with local business leaders, successful former student entrepreneurs and current student entrepreneurs operating at the student incubator.
Prerequisites: Admission to upper division in Mays Business School and senior classification.

MGMT 475 Leadership Development
Credits 3.3 Lecture Hours.
Explores the evolution of leadership theory and practice with an emphasis on effective and ineffective leaders' traits, behaviors, and styles in profit and not-for-profit work organizations; reviews critical aspects of leader role behavior from theoretical and practical perspectives; examines leader effectiveness at the individual, group, and strategic level.
Prerequisite: MGMT 363.

MGMT 477 Entrepreneurship: The Lean Startup Approach
Credits 3.3 Lecture Hours.
Application of current lean startup methodologies working directly with existing student entrepreneurs and mentors in preparing for the launch of a real business at the student incubator (Startup Aggieland); act as advocates and consultants assisting with organizational structure, marketing and market validation, financial analysis and risk assessment.
Prerequisites: Junior or senior classification and approval of instructor.

MGMT 481 Seminar in Management
Credit 1.1 Other Hour.
Discussions and observation of current management practice in the public and private sectors of the nation; reading and discussion of current events and changes taking place in management theory and/or its application and practice in actual business and government situations. May be repeated for credit.
Prerequisites: Admission to upper division in Mays Business School; management major or approval of instructor.

MGMT 484 Management Internship
Credits 1.4 to 4.1 Other Hours.
Internship in management: staffing; planning; organizing; leading and controlling. Enrollment is limited to those who have managerial responsibilities for the resources used by a business firm or the like.
Prerequisites: Management major; MGMT 363; approval of instructor prior to internship.

MGMT 485 Directed Studies
Credits 1 to 3.1 to 3 Other Hours.
Directed study on selected problems in the area of management not covered in other courses.
Prerequisites: Admission to upper division in Mays Business School; senior classification and approval of department head.

MGMT 489 Special Topics in...
Credits 1 to 4.4 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of management. Consult the professor offering a particular special topics course for details. May be repeated for credit.
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.
**MICR - Microbiology (MICR)**

**MICR 289 Special Topics in...**
**Credits 1 to 4. 1 to 4 Lecture Hours.**
Selected topics in an identified area of microbiology. May be repeated for credit.
**Prerequisite:** Approval of instructor.

**MICR 291 Research**
**Credits 1 to 4. 1 to 4 Other Hours.**
Active research of basic nature under the supervision of a Department of Biology faculty member.
**Prerequisites:** Freshman or sophomore classification and approval of instructor.

**MICR 489 Special Topics in...**
**Credits 1 to 4. 1 to 4 Lecture Hours.**
Selected topics in an identified area of microbiology. May be repeated once for credit.

**MICR 491 Research**
**Credits 1 to 4. 1 to 4 Other Hours.**
Active research of basic nature under the supervision of a Department of Biology faculty member.
**Prerequisites:** Junior or senior classification and approval of instructor.

**MKTG - Marketing (MKTG)**

**MKTG 298 Marketing Internship Experience**
**Credits 0. 0 Other Hours.**
Participation in a 300-hour internship in a field related to certificate program. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.

**MKTG 299 Marketing Professional Organization Involvement**
**Credits 0. 0 Other Hours.**
Participation in an approved professional marketing organization. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.

**MKTG 321 Marketing**
**Credits 3. 3 Lecture Hours.**
Exploration of the activities and managerial decisions involved in the provision of products to customers; includes strategic marketing fundamentals, buyer behavior, market segmentation, managerial issues related to the marketing mix (product, pricing, distribution, and promotion) decision variables, and social and ethical issues.
**Prerequisite:** Admission to upper division in Mays Business School.

**MKTG 322 Consumer Behavior**
**Credits 3. 3 Lecture Hours.**
Application of behavioral science designed to provide in-depth knowledge of the fundamental theories and concepts of consumer behavior, with an emphasis on consumers in the marketplace as individuals, as decision makers, and as influenced by culture.
**Prerequisite:** MKTG 321.

**MKTG 323 Marketing Research**
**Credits 3. 3 Lecture Hours.**
Nature and uses of marketing research in business; methods of collecting, analyzing and interpreting data needed for business decisions, with specific application to problems in marketing.
**Prerequisites:** MKTG 321; SCMT 303 or AP STAT 301 or AP STAT 302 or AP STAT 303.

**MKTG 325 Retailing Concepts and Policies**
**Credits 3. 3 Lecture Hours.**
Survey of the concepts, policies, theories, and practices for managing a retail firm in a competitive environment; topics include functions of retailers, retail customers, supply chain, legal and ethical behavior, location analysis, pricing, promotion, customer services, and layout.
**Prerequisite:** MKTG 321.

**MKTG 326 Strategic Retailing**
**Credits 3. 3 Lecture Hours.**
Retail strategies such as channels of distribution, private labels, customer service levels, visual presentation, pricing, and marketing mix that influence a retail business model.
**Prerequisite:** MKTG 321.

**MKTG 335 Professional Selling**
**Credits 3. 3 Lecture Hours.**
General principles of personal selling in both consumer and industrial markets plus specialty selling.
**Prerequisite:** MKTG 321.

**MKTG 336 Managing Business to Business Relationships**
**Credits 3. 3 Lecture Hours.**
Customer relationship management concepts and tools; sales technology; organizational buyer behavior; planning; channels; new products; performance management.
**Prerequisite:** MKTG 335.

**MKTG 345 Social Media and Public Relations**
**Credits 3. 3 Lecture Hours.**
Marketing and promotional strategy related to social media, the internet and interactive media; managing publicity and public relations with a wide variety of stakeholders.
**Prerequisite:** MKTG 321.

**MKTG 347 Advertising and Creative Marketing Communications**
**Credits 3. 3 Lecture Hours.**
Advertising and integrated marketing communications; market segmentation and targeting; development of multi-media campaigns; emphasis on enhancing creativity, critical thinking, and communication skills.
**Prerequisite:** MKTG 321.

**MKTG 401/IBUS 401 Global Marketing**
**Credits 3. 3 Lecture Hours.**
Survey of the aspects involved in marketing goods and services in a global marketplace; social, political, legal, and economic issues associated with conducting business globally.
**Prerequisite:** MKTG 321.
**Cross Listing:** IBUS 401/MKTG 401.

**MKTG 402/IBUS 402 International Marketing: Study Abroad**
**Credits 3. 3 Lecture Hours.**
Introduction to the facets of doing business in an international setting; provides exposure to a variety of foreign cultures; facilitates understanding of the international marketplace in which these students will function.
**Prerequisites:** MKTG 321 or MKTG 409; junior classification; 2.5 GPR overall.
**Cross Listing:** IBUS 402/MKTG 402.
MKTG 403/IBUS 403 International Market Entry Strategies  
Credits 3. 3 Lecture Hours.  
A research-based course in which students prepare an analysis of a country, or region outside the U.S., and use it in the preparation of a marketing plan for a good or service to be introduced and marketed in that country.  
Prerequisites: MKTG 321 or MKTG 409; concurrent registration in IBUS 402/MKTG 402 or MKTG 402/IBUS 402; junior or senior classification.  
Cross Listing: IBUS 403/MKTG 403.

MKTG 404 Advanced Excel for Marketing Managers  
Credit 1. 1 Lecture Hour.  
Hands-on practice and application of the Excel skills needed for marketing decision-making.  
Prerequisites: MKTG 323.

MKTG 409 Principles of Marketing  
Credits 3. 3 Lecture Hours.  
Survey of the basic concepts and decisions associated with product, promotion, distribution, and pricing; focuses on developing marketing strategies that contribute to building long-term customer relationships and achieving the organization's objectives. May not be used to satisfy degree requirements for a major in business.  
Prerequisites: Junior classification; for students other than business and agribusiness majors.

MKTG 425 Retail Merchandising  
Credits 3. 3 Lecture Hours.  
Theories, concepts and practices relating to the merchandising of products for enhancing sales and profit growth of retail businesses; emphasis on retail math, purchasing decisions, vendor negotiations, communications skills, assortment planning and competitive analysis.  
Prerequisite: MKTG 321.

MKTG 426 Advanced Retail Case Study  
Credits 3. 3 Lecture Hours.  
Problems and opportunities faced by retailing organizations; development of an effective strategy through application-oriented seminars and activities, interaction with industry guest speakers and executives; analysis of retail strategies in field settings and completion of a semester long retail audit; participation in a national case competition.  
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

MKTG 430 Marketing Consulting  
Credits 3. 3 Lecture Hours.  
Consulting tools and techniques, managing client relationships, preparing reports and presentations, problem-solving processes; semester-long client project.  
Prerequisites: MKTG 323.

MKTG 431 Marketing Analytics  
Credits 3. 3 Lecture Hours.  
Data driven marketing strategy, data handling and management techniques, use of statistical software to estimate marketing models, project based course focused on marking decision making.  
Prerequisite: MKTG 321.

MKTG 432 Corporate Social Responsibility  
Credits 3. 3 Lecture Hours.  
Study of the role of corporate social responsibility, corporate governance and business ethics with an emphasis on the marketing perspective.  
Prerequisites: MKTG 321.

MKTG 435 Advanced Selling  
Credits 3. 3 Lecture Hours.  
In-depth strategic account planning, extensive role-play and team selling exercises, sales analytics, networking and prospecting, strategic goal setting and time management.  
Prerequisites: MKTG 335.

MKTG 436 Sales Leadership  
Credits 3. 3 Lecture Hours.  
Ethical planning, organizing, staffing, training, motivating and evaluating salespeople; understanding the sales environment and organization as well as career and time management.  
Prerequisite: MKTG 335.

MKTG 438 Strategic Digital Marketing  
Credits 3. 3 Lecture Hours.  
Implications of the internet and related digital technologies for marketing; evolution of the digital marketplace and impact on firms' marketing mix decisions; competitive advantage; public policy issues; future trends and developments.  
Prerequisite: MKTG 321.

MKTG 440 Services Marketing  
Credits 3. 3 Lecture Hours.  
Focuses on the unique challenges of managing a service-based business; delivering quality service to customers and building strong customer relationships; applicable to for-profit and not-for-profit organizations that depend on service excellence for competitive advantage.  
Prerequisite: MKTG 321.

MKTG 442 Innovation and Product Management  
Credits 3. 3 Lecture Hours.  
Opportunity identification, concept generation, concept and program evaluation, development and launch of the various types of new products; specific topics include creativity, design, launch and management of new products.  
Prerequisite: MKTG 321.

MKTG 444 Account Planning and Research  
Credits 3. 3 Lecture Hours.  
Concepts in account planning: gathering and analyzing data (database analysis, focus groups, interviews, surveys); compilation of research into a situation analysis and creative brief for use in a national advertising case competition.  
Prerequisites: MKTG 321, approval of instructor.

MKTG 445 Advanced Advertising: Case Competition  
Credits 3. 3 Lecture Hours.  
Development of a fully integrated, multi-million dollar budgeted advertising campaign plan; participation in a national case competition.  
Prerequisite: MKTG 321; approval of instructor.

MKTG 446 Marketing Strategy  
Credits 3. 3 Lecture Hours.  
Marketing decision-making and strategies in case situations; integration of product, pricing, distribution, and promotion considerations for the purposes of determining and evaluating the optimal marketing strategy.  
Prerequisite: MKTG 323; graduating marketing senior.
MKTG 484 Marketing Internship
Credits 3. 3 Other Hours.
Directed internship of at least 300 hours of work under the supervision of a marketing professional providing students with on-the-job training that advances their career objectives; emphasis on business communication and personal professional development.
Prerequisites: Marketing major; MKTG 321; approval of instructor prior to internship.

MKTG 485 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Directed study of selected problems in the area of marketing not covered in other courses.
Prerequisites: MKTG 321; approval of department head; 2.5 GPR in major and overall.

MKTG 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of marketing. May be repeated once for credit.
Prerequisites: Admission to upper division in Mays Business School and approval of instructor.

MLSC - Military Science (MLSC)

MLSC 121 Introduction to the United States Army I
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Introduction to the United States Army and the Army Reserve Officer Training Corps (ROTC); its purpose in the Army and its advantages; Army customs, courtesies, traditions, and Army values; Army history and individual soldier skills with an emphasis on leadership; includes a leadership laboratory.

MLSC 122 Introduction to the United States Army II
Credits 2. 1 Lecture Hour. 3 Lab Hours.
The second half of an introductory two-semester survey of the United States Army; principles of leadership, Army history, management theory and individual soldier skills; emphasis on critical thinking and problem solving skills; foundation for tactical and leadership concepts; includes a leadership laboratory.

MLSC 221 Tactics and Leadership Theory I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Dimensions of creative and innovative leadership strategies through team dynamics and leadership theories that form the basis of the Army leadership framework (trait and behavior theories); infantry tactics, techniques and procedures; includes a leadership laboratory.

MLSC 222 Tactics and Leadership Theory II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
The second half of a two-semester survey on leadership theory and infantry tactics; emphasis on leading tactical teams in a complex environment; Army planning and orders process; adaptive leadership styles in the context of military operations; case studies on the importance of teamwork and tactics in real-world scenarios; includes a leadership laboratory.

MLSC 321 Adaptive Leadership and Tactical Operations I
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Theoretical and practical application of adaptive leadership as it relates to planning, executing and evaluating complex tactical operations; ability to assess risk, ethical decision-making, managing people and critical thinking skills in a tactical environment; includes a leadership laboratory.

MLSC 322 Adaptive Leadership and Tactical Operations II
Credits 3. 3 Lecture Hours. 1 Lab Hour.
The second half of a two-semester survey on adaptive leadership and tactical operations; ethical decision-making, planning, executing and evaluating military operations at a tactical level; preparation to attend the Leadership, Development and Assessment Course (LDAC) for the Army's commissioning process; includes a leadership laboratory.

MLSC 421 The Army Officer and the Profession of Arms I
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Advanced study, research and practical application of Army training, operations and doctrine; the military as a profession, functioning as a member of a staff, and officership; law of land warfare, principles of war, and rules of engagement and their application; duties and responsibilities of a Second Lieutenant in the United States Army; includes a leadership laboratory.

MLSC 422 The Army Officer and the Profession of Arms II
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Dynamics of leadership in a complex world; cultural awareness, terrorism, non-governmental organizations, and operational security; off-site battlefield analysis and application of military concepts; maintaining an ethical climate in an organization, military support structures, and equal opportunity; duties and responsibilities of a Second Lieutenant in the United States Army; includes a leadership laboratory.

MLSC 485 Directed Studies
Credits 1 to 3. 1 to 3 Lecture Hours. 0 to 3 Lab Hours.
Directed study of problems in the field of military science.
Prerequisite: Junior or senior classification with approval of department head.

MLSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified field of military science. May be repeated once for credit.
Prerequisites: Junior or senior classification or approval of instructor.

MMET - Mfg & Mech Engr Tech (MMET)

MMET 105 Engineering Graphics
Credits 2. 1 Lecture Hour. 3 Lab Hours.
(ENGR 1204, ENGR 1304) Engineering Graphics. Graphical approach to the engineering design process as applied to products; methods of graphical communications, three-dimensional geometry, working drawings, data analysis, computer graphics, introduction to team dynamics and creative problem solving.

MMET 181 Manufacturing and Assembly Processes I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
A survey of metal manufacturing processes; traditional machining, non-traditional machining, welding, fabrication, casting and assembly.
Prerequisite: Grade of C or better in MMET 105 or ENGR 111, or concurrent enrollment.
MMET 201 Manufacturing and Materials
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Survey of metallic and non-metallic materials; selection and applications of materials; introduction to traditional and non-traditional manufacturing processes, assembly processes, and metrology.
Prerequisite: ENGR 111 with a grade of C or better; CHEM 107 with a grade of C or better; CHEM 117 with a grade of C or better.

MMET 206 Nonmetallic Materials
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to structure, properties, processing and application of ferrous and nonferrous materials; beneficiation, production of ferrous and nonferrous metals, destructive and nondestructive testing, protective coatings, strengthening and heat treatment; laboratory includes metallographic procedures, mechanical testing, heat treatment, surface treatment, corrosion testing, recrystallization and failure analysis.
Prerequisite: CHEM 102 or CHEM 107 with a grade of C or better; manufacturing and mechanical engineering technology or industrial distribution major or approval of department.

MMET 207 Metallic Materials
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to structure, properties and engineering application of metallic and non-metallic discrete parts.
Prerequisite: Grade of C or better in MATH 152 and PHYS 218; manufacturing and mechanical engineering technology major or approval of department.

MMET 275 Mechanics for Technologists
Credits 3. 3 Lecture Hours.
Forces, moments and couples in 2-D and 3-D systems; equilibrium of rigid bodies; friction and applications; centroids and moments of inertia; review of particle dynamic principles; kinematics and kinetics of rigid bodies; principles of impulse-momentum and work-energy; computer use in selected areas.
Prerequisites: Grade of C or better in MATH 152 and PHYS 218; manufacturing and mechanical engineering technology major or approval of department.

MMET 281 Manufacturing and Assembly Processes II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Continuation of MMET 181. Economics and manufacturability in polymer molding processes; assembly (fits and tolerances); compatibility of metallic and non-metallic discrete parts.
Prerequisites: Grade of C or better in MMET 181 and MMET 206; manufacturing and mechanical engineering technology major or approval of department.

MMET 303 Fluid Mechanics and Power
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Fluid mechanics and fluid power applications for technologists; fluid properties; conservation of energy and momentum; incompressible flow in pipes; standard symbols: components and control of hydraulic systems and pneumatic systems.
Prerequisites: MMET 275, ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, PHYS 218 with a grade of C or better.

MMET 307 Computer Design Graphics
Credits 3. 3 Lecture Hours.
Use of microcomputers with currently available CAD software as an aid in the design process and as a means of increasing engineering productivity; review of ANSI standards and an introduction to a variety of computer graphics applications encountered in industry; user-oriented.
Prerequisites: Grade of C or better in MMET 105 or MMET 181.

MMET 313 Industrial Welding Processes
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Theory and practical applications of industrial welding and cutting processes; experience in operation of various machines and processes.
Prerequisites: Grade of C or better in MMET 181 and MMET 207 and MMET 376; grade of C or better in ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218; junior or senior classification in manufacturing and mechanical engineering technology major.

MMET 320 Quality Assurance
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Applied statistical process control and design-of-experiment techniques for quality improvement and process characterization; emphasis on organizations operating in a continuous-improvement, customer-driven environment; statistical thinking; control charts; capability analysis of product, process and measurement system; experimental process characterization, prediction models and input variable control.
Prerequisites: STAT 211 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 361 Product Design and Solid Modeling
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Design processes and methodologies including quality function deployment, materials and process selection, and design for manufacturing and assembly; fundamentals of modeling part geometry and mechanical assembly using parametric CAD software.
Prerequisites: Grade of C or better in ENGR 112, MMET 181, MMET 206, MMET 207 and MMET 275; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 363 Mechanical Design Applications I
Credits 3. 3 Lecture Hours.
Principles of design of mechanical components; theories of failure; Soderberg and Goodman diagrams; fatigue and fracture design criteria; materials and their selection to engineering applications; component assembly aspects; design of fasteners and springs as examples.
Prerequisites: MMET 376 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 370 Thermodynamics for Technologists
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Thermal and mechanical energy transformations; relationships applied to flow and non-flow processes in power and refrigeration cycles; devices include compressors, turbines, heat exchangers, nozzles, diffusers, pumps and piston-cylinder models; computer modeling.
Prerequisites: PHYS 218 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117; junior or senior classification in manufacturing and mechanical engineering technology.
MMET 375 Applied Dynamic Systems  
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Study of translational mechanical system dynamics, rotational mechanical system dynamics, electrical system dynamics modeling, electro-mechanical/mechatronics system dynamics, fluid power dynamics and 2 dimensional rigid body dynamics.  
**Prerequisites:** Grade of C or better in MMET 275; junior or senior level classification.

MMET 376 Strength of Materials  
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Stress and strain; elastic moduli Poisson's ratio; torsion, bending, unsymmetrical bending; design of beams and shafts; deflection of beams; buckling of columns; material and strength characterization laboratory tests.  
**Prerequisites:** Grade of C or better in MMET 207 and MMET 275; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 380 Computer-Aided Manufacturing  
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Basic concepts in computer-aided manufacturing with emphasis on a system approach to manufacturing activities; use of numerical control machine tools and other computer based software as applied to different industries.  
**Prerequisites:** Grade of C or better in MMET 181 and MATH 152; completion of ENGL 104, MATH 151, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 383 Manufacturing Information Systems  
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Use of information technology for manufacturing enterprise applications, including computer-integrated manufacturing, database, computer networking, web-technology and enterprise resource planning.  
**Prerequisites:** MMET 380 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 402 Inspection Methods and Procedures  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Methods and procedures in nondestructive inspection of materials and industrial products; ultrasonics, dye penetrants, magnetic particle, radiography and supportive evaluation methods such as weld sectioning, polishing, etching and macroscopic analysis.  
**Prerequisites:** Grade of C or better in MMET 281 and MMET 376; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 405 Weldability of Ferrous Metals  
Credits 3. 3 Lecture Hours.
Applied principles of metallurgy with reference to weldability of ferrous metals.  
**Prerequisites:** MMET 207 or MEEN 340; MMET 313 or approval of instructor; admitted to major degree sequence (upper-level) in engineering technology.

MMET 410 Manufacturing Automation and Robotics  
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Hardware for automated work handling, conveyors, loaders, robots, storage devices; power sources and methods of control, electric motors, controllers, program logic controllers, robot programming; interfacing of equipment controls; and manufacturing work cells.  
**Prerequisites:** Grade of C or better in MMET 361, MMET 376, MMET 380, MMET 383 and ISEN 303; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 412 Production and Inventory Planning  
Credits 3. 2 Lecture Hours. 2 Lab Hours.
An introductory treatment of models and techniques for the planning of production and inventory systems.  
**Prerequisites:** Grade of C or better in MMET 320, MMET 380, MMET 383 and ISEN 302; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; senior classification in manufacturing and mechanical engineering technology.

MMET 414 Micro/Nano Manufacturing  
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Product miniaturization and impact; review of atomic structure, electrical and physical properties of materials; ultraprecision machining; microlithography; dry and wet etching/sputtering techniques; isotropic and anisotropic processes; pattern transfer with additive processes; surface micromachining; microreplication processes; introduction to packaging technology and nanometrology; manufacturing of selected Microsystems (MEMS) and their applications.  
**Prerequisites:** CHEM 107; PHYS 208; senior or graduate in engineering or science; admitted to major degree sequence (upper-level) in engineering technology for ENTC majors.

MMET 418 Medical Manufacturing  
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Surveys relevant regulations, biocompatibility of engineering materials, and emphasizes suitable techniques for medical device manufacturing.  
**Prerequisites:** MMET 181, junior or senior level classification or approval of instructor.

MMET 422 Manufacturing Technology Projects  
Credits 2. 1 Lecture Hour. 3 Lab Hours.
A capstone projects course utilizing a team approach to an analysis and solutions of manufacturing problems.  
**Prerequisites:** MMET 429 with a grade of C or better; completion of junior-level courses; must be taken semester of graduation; approval of instructor; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; senior classification in manufacturing and mechanical engineering technology.

MMET 429 Managing People and Projects in a Technological Society  
Credits 3. 3 Lecture Hours.
Supervisory and project management duties and responsibilities in technology based organizations and the methods required to fulfill these functions.  
**Prerequisites:** ISEN 302 with a grade of C or better; MMET 361 with a grade of C or better; or approval of instructor; must be taken during long semester prior to MMET 422; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; senior classification in manufacturing and mechanical engineering technology.
MMET 463 Mechanical Design Applications II
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Applications of principles of analysis and design of machines and machine elements including linkages, robots, cam and follower systems, shafts, gears, clutches, belt and chain drives; introduction to the mathematical tools for the analysis and design of these machines and machine elements.
Prerequisites: Grade of C or better in MMET 361 and MMET 363; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; senior classification in manufacturing and mechanical engineering technology.

MODL - Modern Languages (MODL)

MODL 221/ENGL 221 World Literature
Credits 3. 3 Lecture Hours.
(ENGL 2332) World Literature. Survey of world literature from the ancient world through the sixteenth century in relation to its historical and cultural contexts; texts selected from a diverse group of authors, traditions and genres.
Cross Listing: ENGL 221/MODL 221.

MODL 222/ENGL 222 World Literature
Credits 3. 3 Lecture Hours.
(ENGL 2333) World Literature. Survey of world literature from the seventeenth century to the present in relation to its historical and cultural contexts; texts selected from a diverse group of authors, tradition and genres.
Cross Listing: ENGL 222/MODL 222.

MODL 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Individual supervision of readings or assigned projects, selected for each student individually. Written and oral reports. No class meetings.
Prerequisite: Approval of department head.

MODL 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of modern languages. May be repeated for credit.
Prerequisite: Approval of department head.

MSEN - Materials Science & Engr (MSEN)

MSEN 201 Fundamentals of Materials Science and Engineering
Credits 3. 3 Lecture Hours.
Fundamental principles of materials science and engineering and their application toward complex engineering challenges; relationship between materials structure and structural and functional properties of engineered materials; property-performance relationships; principle classes of materials, as illustrated through key materials advances; current directions in the field.
Prerequisites: CHEM 102 or CHEM 104 or CHEM 107; PHYS 218.

MSEN 210 Thermodynamics of Materials
Credits 3. 3 Lecture Hours.
Basic concepts and fundamental laws of thermodynamics; processes and thermodynamic engines; phase equilibria and phase diagrams of simple substances; chemical reactions of condensed phases; computational software for thermodynamic and phase diagram calculations.
Prerequisites: MSEN 201 and MATH 152, or concomitant enrollment.

MSEN 220/CHEM 220 Physics and Chemistry of Inorganic Materials
Credits 3. 3 Lecture Hours.
Structure, properties and function of materials developed from an atomistic and molecular perspective emphasizing quantum chemical descriptions; elements of solid-state chemistry and physics including bonding, crystal structure and symmetry, origin of electronic band structure, synthesis and characterization tools in materials chemistry and role of finite size effects.
Prerequisite: PHYS 208 or CHEM 102, or concurrent enrollment.
Cross Listing: CHEM 220/MSEN 220.

MSEN 222/MEEEN 222 Material Science
Credits 3. 3 Lecture Hours.
Mechanical, optical, thermal, magnetic and electrical properties of solids; differences in properties of metals, polymers, ceramics and composite materials in terms of bonding and crystal structure.
Prerequisites: CHEM 102, or CHEM 104 and CHEM 114, or CHEM 107 and CHEM 117, PHYS 218.
Cross Listing: MEEEN 222/MSEN 222.

MSEN 240 Kinetics of Materials
Credits 3. 3 Lecture Hours.
Application of physical principles that drive evolution of materials as they approach thermodynamic equilibrium states; includes Gibbs free energy, driving forces, point defects, diffusion in solids, interface and grain boundary motion, nucleation, growth, transformation diagrams, precipitation, phase separation, ordering and solidification.
Prerequisite: MSEN 210.
MSEN 250 Soft Matter
Credits 3. 3 Lecture Hours.
Structure, properties and function of various classes of soft matter including colloids, polymers, amphiphils, liquid crystals and biomacromolecules; basic concepts of viscoelasticity, glass transition, liquid-liquid and liquid-solid transitions and gelation; forces acting between mesoscopic objects; supramolecular self-assembly in soft condensed matter.
Prerequisites: PHYS 208, CHEM 102 and CHEM 112.

MSEN 281 Materials Science and Engineering Seminar
Credit 1. 1 Lecture Hour.
Presentation of technical advances in the field of materials science and engineering; applications toward solving engineering challenges; presentations from visiting industry, academic speakers, and faculty; introduction to current research themes and focal points in industry.
Prerequisite: MSEN 201.

MSEN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study of selected problems in the area of materials science and engineering. May be taken for credit 4 times.
Prerequisite: Approval of instructor.

MSEN 289 Special Topics In...
Credits 1 to 3. 1 to 3 Lecture Hours. 0 to 3 Lab Hours.
Selected topics in an identified area of materials science and engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

MSEN 301 Unified Materials Lab I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Integration of materials synthesis, structural characterization and property evaluation; theory and practice of experimental and simulation techniques; emphasis on relationship between processing parameters and resulting materials structure.
Prerequisites: MSEN 240 and MSEN 310 or concurrent enrollment.

MSEN 302 Unified Materials Lab II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Integration of materials synthesis, structural characterization and property evaluation; theory and practice of experimental and simulation techniques; emphasis on relationship between materials structure and resulting materials physical properties.
Prerequisite: MSEN 301.

MSEN 310 Structure of Materials
Credits 3. 3 Lecture Hours.
Materials structure over many orders of scale; structure of non-crystalline materials; symmetry, unit cell and the atomic structure of crystalline materials; liquid crystals; structural defects in ordered solids; microstructures and hierarchical structures.
Prerequisite: MSEN 201, MSEN 222/MEEN 222, AERO 413, BMEN 343, CHEN 313, CVEN 306, ENTC 206, or NUEN 265, or approval of instructor.

MSEN 320 Deformation and Failure Mechanisms in Engineering Materials
Credits 3. 3 Lecture Hours.
Survey of deformation and failure mechanisms in different materials, including metals, ceramics, polymers and composites; effect of atomistic structure, defects and microstructure on deformation and failure; deformation and failure mechanism maps and effects of temperature and deformation rate.
Prerequisite: MSEN 310 or approval of instructor.

MSEN 330 Numerical Methods for Materials Scientists and Engineers
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Computing platforms addressing scientific/engineering problems related to materials science and engineering; analyze data; implement mathematical models of materials behavior; numerical methods to solve materials-related problems.
Prerequisite: MATH 307.

MSEN 340 Case Studies in Materials
Credits 2. 2 Lecture Hours.
Case studies illustrating materials failure and consequences thereof; materials selection process in the face of uncertainty; industry standards and regulatory frameworks; design tradeoffs and cost analysis; ethical and business implications of materials failure.
Prerequisite: MSEN 310.

MSEN 370 Computational Materials Science and Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Studio emphasizing methods to simulate materials behavior across multiple scales; includes electronic structure calculations, classical molecular dynamics, computational thermodynamics and kinetics of materials, microstructure evolution simulation and continuum models of materials behavior.
Prerequisites: MSEN 210 and MSEN 330.

MSEN 400 Design and Analysis of Materials Experiments
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Systematic design of experimental investigations; team approach to identify topics and develop experiment designs including establishing the need, associated requirements and objective; conduct experiments; characterize materials; analyze and interpret results; documenting the procedures, analysis, results and conclusions; present written and oral reports.
Prerequisites: MSEN 220/CHEM 220, MSEN 302 and MSEN 320.

MSEN 401 Materials Research and Design I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Research and design process; need definition, functional analysis, performance requirements, evaluation criteria, conceptual design evaluation; introduction to systems engineering; parametric and risk analysis, failure analysis, material selection and manufacturability; cost and life cycle issues, project management; topics from sponsored research or an industry-sponsored design project.
Prerequisites: MSEN 281, MSEN 340 and MSEN 400.

MSEN 402 Materials Research and Design II
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Continuation of MSEN 401; development of innovative solutions to research or industry-provided design challenges; structured framework and methodology for design activities; innovation, computational materials science, synthesis/processing and analysis/characterization of material components; project definition, management, customer interaction and effective team participation; presentations and design reviews.
Prerequisite: MSEN 401.

MSEN 410 Materials Processing
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Synthesis, properties and processing of technologically important inorganic materials (metals and ceramics); includes thermodynamics and kinetics of different materials processing methods, casting, deformation processing, heat treatments, powder processing and sintering, coating and thin films processing, etc.
Prerequisite: MSEN 201, MSEN 222/MEEN 222, AERO 413, BMEN 343, CHEN 313, CVEN 306, ENTC 206, or NUEN 265, or approval of instructor.
MSEN 415 Defects in Solids
Credits 3. 3 Lecture Hours.
Overview of point, line and surface defects in solids; relates defect properties to diffusion, deformation, phase transformations; focuses on atomic defects in crystals, with additional examples from liquid crystals, superconductors and ferromagnets; incorporates atomistic modeling to examine defect structure.
Prerequisite: MSEN 310 or approval of instructor.

MSEN 420 Polymer Science
Credits 3. 3 Lecture Hours.
Types of polymerization; molecular characteristics of polymer chains; single chain statistics and rubber elasticity; phase transitions, glass transition, viscoelasticity and time-temperature superposition; polymer structure at the molecular, microscopic and macroscopic level; polymer thermosets, thermoplastics, elastomers, fibers, and advanced nanoparticle-filled composites.
Prerequisite: PHYS 208, CHEM 102 and CHEM 112; or approval of instructor.

MSEN 426 Polymer Laboratories
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Laboratory to prepare those interested in polymer research with necessary experimental and analytical skills to conduct and analyze experimental work.
Prerequisite: MSEN 250 or approval of instructor.

MSEN 430 Nanomaterials Science
Credits 3. 3 Lecture Hours.
Nanotechnology and nanomaterials; types, fabrication, characterization methods and applications; current roles in technology and future impact of such systems on industry targeting.
Prerequisite: MSEN 310, junior or senior classification; or approval of instructor.

MSEN 440 Materials Electrochemistry and Corrosion
Credits 3. 3 Lecture Hours.
Survey of thermodynamic and kinetic fundamentals of electrochemistry; multiscale materials corrosion mechanisms; details of interfacial aqueous electrochemical mechanisms and the environmental effects when materials are exposed to different conditions.
Prerequisite: MSEN 220/CHEM 220 or approval of instructor.

MSEN 444 Corrosion and Electrochemistry Lab
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Laboratory practice and principles for corrosion and electrochemistry methods; design, carry out and analyze a series of labs illustrating the most important techniques in the field; builds to an open-ended corrosion engineering problem resulting in preparation of a technical report for a hypothetical client.
Prerequisite: MSEN 440.

MSEN 446 Corrosion Prevention and Control Methods
Credits 3. 3 Lecture Hours.
Cathodic protection and coatings; functional engineering approach to controlling and preventing aqueous corrosion; impressed current, galvanic anodes, organic, inorganic and hybrid coatings; case studies in oil and gas, energy, automotive and different industries.
Prerequisites: MSEN 360 and MEEN 444.

MSEN 458 Fundamentals of Ceramics
Credits 3. 3 Lecture Hours.
Structure-property relationships of ceramics and ceramic composites; atomic bonding in ceramics; crystalline and glassy structures; phase equilibria and ceramic reactions; mechanical, electrical, thermal, dielectric, magnetic and optical properties; ceramic processing; different properties of ceramics will be related to their underlying structure.
Prerequisite: MSEN 310 or approval of instructor.

MSEN 460 Properties of Functional Materials
Credits 3. 3 Lecture Hours.
Origins of functional materials properties from their electronic and molecular structure; electron theory in solids; electronic transport and dielectric behavior; optical and magnetic properties; current applications of functional materials.
Prerequisite: MSEN 201, MSEN 222/MEEN 222, AERO 413, BMEN 343, CHEN 313, CVEN 306, ENTC 206, or NUEN 265, or approval of instructor.

MSEN 462 Advanced Materials Characterization
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles and techniques used in characterization of different materials, including metals, ceramics, polymers, composites and semiconductor systems; microstructural, chemical/compositional and surface analysis methods; interpretation and analysis of the characterization results.
Prerequisites: MSEN 220/CHEM 220, MSEN 250, and MSEN 310; or approval of instructor.

MSEN 467 Advanced Materials Characterization
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Modern methods of computational modeling and simulation of materials properties and phenomena at the atomistic scale; quantum, classical and statistical mechanical methods, including semi-empirical atomic and molecular-scale simulations, and other modeling techniques using macroscopic input.
Prerequisite: MSEN 370 or approval of instructor.

MSEN 474 Materials Modeling of Phase Transformation and Microstructural Evolution
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Computer modeling and simulation of microstructural evolution during various phase transformation processes in solid materials, including spinodal decomposition, ordering, martensitic transformation, ferroelectric and ferromagnetic domain evolution, nucleation, growth, and solidification.
Prerequisite: MSEN 370 or approval of instructor.

MSEN 476 Multi-Scale Computational Materials Science
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Advanced and problem-based; illustrating elements of challenges associated with multi-scale simulations; examination of multi-scale modeling of elastic response of a multi-phase microstructure; elements of uncertainty quantification and propagation.
Prerequisite: MSEN 370 or approval of instructor.

MSEN 480 Communicating Materials Science and Engineering
Credit 1. 1 Lecture Hour.
Effective communication of technical topics in materials science and engineering to technical and non-technical audiences; emphasis on oral and visual presentations.
Prerequisite: MSEN 401 or concurrent enrollment.
MSEN 484 Internship  
Credits 0 to 4. 0 to 4 Other Hours.  
Practical experience working in a professional materials science and engineering setting offered on an individual basis. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisites: Junior or senior classification and approval of instructor.

MSEN 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Directed study of selected problems in the area of materials science and engineering. May be taken four times for credit.  
Prerequisite: Approval of instructor.

MSEN 489 Special Topics In...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of materials science and engineering. May be repeated for credit.  
Prerequisite: Approval of instructor.

MUSC 102, MUSC 204, PERF major or minor, or approval of instructor.

MUSC 102 Fundamentals of Music  
Credits 3. 3 Lecture Hours.  
(MUSI 1301, MUSI 1303, MUSI 1304) Fundamentals of Music.  
Introduction to the basic elements of music (pitch, rhythm, scales, intervals and triads) and how these elements interrelate to form musical compositions; the application of musical understanding to particular instruments such as the guitar, keyboard, recorder and voice.

MUSC 200 Topics in Music  
Credits 3. 3 Lecture Hours.  
The study of a circumscribed musical topic in its sociohistorical context; emphasis on the aesthetic, social and cultural issues affecting music rather than on technical analysis. May be repeated for credit.

MUSC 201 Music and the Human Experience  
Credits 3. 3 Lecture Hours.  
(MUSI 1306) Music and the Human Experience. An introduction to music and related issues; designed to enhance the student’s knowledge and perception of music; selected works in various styles within historical, psychological and aesthetic contexts.

MUSC 204 Music Theory I  
Credits 3. 3 Lecture Hours. 0 Lab Hours.  
(MUSI 1211, MUSI 1311) Music Theory I. Structural principles of diatonic harmony and voice leading, phrase and period structure, rhythmic structure and aural and written analysis and composition of small instrumental and vocal musical forms found in common practice period and recent popular musics.  
Prerequisites: PERF major or minor, or approval of instructor.

MUSC 205 Music Theory II  
Credits 3. 3 Lecture Hours.  
(MUSI 1212, MUSI 1312) Music Theory II. Continuation of structural principles in tonal harmony and voice leading, including chromaticism and modulation; composition and analysis of larger musical forms, including binary, rounded binary, ternary, rondo, theme and variations and sonata form.  
Prerequisites: MUSC 204, PERF major or minor, or approval of instructor.

MUSC 206 Music Theory III  
Credits 2. 2 Lecture Hours. 1 Lab Hour.  
(MUSI 2211, 2212, 2311, 2312) Music Theory III. Continued study of harmonic, contrapuntal and set-theoretical principles, composition and analysis of highly chromatic tonal music and twentieth-century music; includes mode mixture, Neapolitans, augmented sixths, “tall” chords, substitute chords, passing harmonies, enharmonicism, extended chromaticism, modes, artificial scales, impressionism, pandiatonicism, atonality, serialism, aleatory, sound mass, minimalism and electronic music.  
Prerequisites: MUSC 205 and MUSC 210, and music major or minor status; concurrent enrollment in MUSC 212.

MUSC 207 Form and Analysis  
Credits 2. 2 Lecture Hours. 1 Lab Hour.  
Focus on phrase structure, traditional small and large forms in full score, Baroque compositional procedures, reductive (pre-Shenkerian) analytical techniques and Schoenbergian composition theory; extensive listening, reading and analysis; includes binary, ternary, rondo, variation, sonata and fugue; musicianship studies from earlier courses.  
Prerequisites: MUSC 206 and MUSC 212 and music major or minor status.

MUSC 208 Musicianship I  
Credit 1. 2 Other Hours.  
(MUSI 1116, 1216) Musicianship I. Application of concepts taught in MUSC 204; focus on ear training, aural analysis, sight singing, rhythm and rudimentary keyboard skills.  
Prerequisites: MUSC 102, and music major or minor status; concurrent enrollment in MUSC 204.

MUSC 209 Global Musicianship  
Credits 3. 3 Lecture Hours.  
Aesthetics and meaning-making in global music traditions; analysis of musical structures and performance; advanced practice in rhythm, melody, listening skills, harmony, improvisation and oral analysis.  
Prerequisites: Major or minor in PERF, or approval of instructor.

MUSC 210 Musicianship II  
Credit 1. 2 Other Hours.  
(MUSI 1117, 1217) Musicianship II. Application of concepts taught in corequisite course MUSC 205; focus on ear training, aural analysis, sight singing, rhythm and rudimentary keyboard skills.  
Prerequisites: MUSC 204 and MUSC 208 and music major or minor status; concurrent enrollment in MUSC 205.

MUSC 211 Music in Practice  
Credits 3. 3 Lecture Hours.  
Project-based approach to Western music traditions; critical reflection on aesthetics and performance of Western music; cross-cultural influences; notation and ear training; knowledge applied to the creative process.  
Prerequisites: Major or minor in PERF, or approval of instructor.

MUSC 212 Musicianship III  
Credit 1. 2 Other Hours.  
Application of concepts taught in MUSC 206; focus on ear training, aural analysis, sight singing, rhythm and rudimentary keyboard skills.  
Prerequisites: MUSC 205 and MUSC 210 and music major or minor status; concurrent enrollment in MUSC 206.
MUSC 214 Perspectives on World Music
Credits 3. 3 Lecture Hours.
A thematic overview of basic issues in ethnomusicology; provides an appreciation of the diversity of ways in which music sound and music making are organized in world cultures; includes music making and the performance event, music and identity, music and nationalism, and music and globalization.
Prerequisites: MUSC 204, ENGL 104 and ANTH 201, or approval of instructor.

MUSC 215 Fieldwork in World Music
Credits 3. 3 Lecture Hours.
Hands-on experience with readings in and critical analysis of ethnographic musical research; philosophies and practices of fieldwork on the world's music.
Prerequisite: MUSC 214 or approval of instructor.

MUSC 221 Guitar Heroes
Credits 3. 3 Lecture Hours.
Survey of social, cultural and aesthetic transformations of music history centered on important classical guitarists; exploration of their performance and compositional/musical styles; analysis of how their contributions gave rise to and revived the guitar’s popularity as a concert-level instrument in both the classical and folk idioms.

MUSC 222 Music of the Americas
Credits 3. 3 Lecture Hours.
Evolution of music of the Americas and the Caribbean; influence of natives, people of forced relocation and people from European communities; the syncretic process of music making.

MUSC 225 History of Jazz
Credits 3. 3 Lecture Hours.
Non-technical survey of jazz as America's classical music, from the earliest recorded blues through the most recent trends; examination of how jazz has broadly expressed issues of modern life.

MUSC 226 History of Rock
Credits 3. 3 Lecture Hours.
Examination of the development of rock music; emphasis on how the sounds and meaning of music reflects culture, ideology and history.

MUSC 227 Popular Music of India
Credits 3. 3 Lecture Hours.
Introduction to Indian popular musics and society; focus on musical, cultural and aesthetic features of "Bollywood" films and film songs; overview of Indian social, cultural and religious expression.

MUSC 228 History of Electronic Music
Credits 3. 3 Lecture Hours.
Historical survey of electronic music, including key technological advancements, people and musical works; exploration of electronic music from different genres and countries.

MUSC 235 Introduction to Composition
Credits 3. 3 Lecture Hours.
Significant styles and techniques in contemporary music including classical, jazz and popular trends; contemporary sonic design achieved through written exercises, reading and critical listening.
Prerequisite: MUSC 204.

MUSC 245 Composition I
Credit 1. 2 Other Hours.
Instruction in composition; the writing of small-form musical compositions employing contemporary styles; techniques in writing for instrumental, vocal, electronic and mixed-media resources. May be taken two times for credit.
Prerequisite: MUSC 207 or approval of instructor.

MUSC 253 Individual Performance: Guitar I
Credit 1. 0 Lecture Hours. 3 Lab Hours.
(MUSI 1102) Individual Performance: Guitar I. Instruction in guitar performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
Prerequisite: Approval of instructor.

MUSC 254 Individual Performance--Voice I
Credit 1. 2 Other Hours.
(MUSI 1183) Individual Performance--Voice I. Instruction in vocal performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit.
Prerequisite: Approval of instructor.

MUSC 255 Individual Performance--Keyboard I
Credit 1. 2 Other Hours.
(MUSI 1114, MUSI 1115, MUSI 1181, MUSI 1182, MUSI 2181, MUSI 2182) Individual Performance--Keyboard I. Instruction in keyboard performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit.
Prerequisite: Approval of instructor.

MUSC 256 Individual Performance: String I
Credit 1. 0 Lecture Hours. 3 Lab Hours.
Instruction in string performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
Prerequisite: Approval of instructor.

MUSC 259 Individual Performance via Classroom Instruction
Credit 1. 0 Lecture Hours. 3 Lab Hours.
Individual performance skills studied in a classroom setting; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods. May be taken six times for credit.

MUSC 270 Individual Performance: Woodwind I
Credit 1. 3 Lab Hours.
Instruction in woodwind performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
Prerequisite: Approval of instructor.

MUSC 271 Individual Performance: Brass I
Credit 1. 3 Lab Hours.
Instruction in brass performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
Prerequisite: Approval of instructor.
MUSC 272 Individual Performance: Percussion I
Credit 1. 3 Lab Hours.
(MUSI 1188) Individual Performance: Percussion I. Instruction in percussion performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
Prerequisite: Approval of instructor.

MUSC 280 Ensemble Performance--Symphonic Band
Credit 1. 3 Lab Hours.
Three select musical performing ensembles (symphonic, concert and campus bands) composed of 65 to 100 members each and devoted to learning the extensive literature written for wind band; activities include at least two concerts per semester; annual tours during spring for the symphonic band. Students may register in up to but no more than two different sections of this course. May be repeated for credit.
Prerequisite: Approval of instructor.

MUSC 281 Ensemble Performance--Small Ensembles
Credit 1. 3 Lab Hours.
Participation in small ensemble performance; the study and performance of small ensemble repertory from all historical periods and styles. May be repeated for credit.
Prerequisite: Satisfactory audition.

MUSC 282 Ensemble Performance--Jazz Ensemble
Credit 1. 3 Lab Hours.
A select musical performing ensemble of 18 to 25 members devoted to performing all styles and periods of jazz music from big band to modern jazz; activities include at least 2 performances each semester. May be repeated for credit.
Prerequisite: Satisfactory audition.

MUSC 283 University Student Orchestra
Credit 1. 3 Lab Hours.
The rehearsal and performance of orchestra literature of various historical backgrounds; full ensemble rehearsal, individual practice, and public performances; development of knowledge, understanding, and appreciation for aspects of music ranging from the Renaissance to the Modern Era. May be repeated 10 times for credit.
Prerequisites: Previous orchestral experience; successful audition with Conductor.

MUSC 285 Directed Studies
Credits 0 to 9. 0 to 9 Other Hours.
Directed Studies in specific problems in identified areas of music. May be taken for credit up to 9 hours.
Prerequisites: Approval of instructor and department head; MUSC majors and minors only.

MUSC 286 Ensemble Performance--Symphony Orchestra
Credit 1. 3 Other Hours.
Participation in the Brazos Valley Symphony Orchestra, a community/ university ensemble; includes rehearsals off campus and varying course requirements depending on the setting and needs of the student. May be repeated for credit.
Prerequisite: Satisfactory audition.

MUSC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of music. May be repeated for credit.
Prerequisite: Approval of instructor.

MUSC 290 Ensemble Performance--Choir
Credit 1. 1 Other Hour.
A select musical performing ensemble composed of 40 to 70 members devoted to learning and performing works from the vast repertory of choral music from all historical periods and styles; several performances, occasionally with orchestra, each semester on and off campus. Students may register in up to but no more than two different sections of this course. May be repeated for credit.
Prerequisite: Satisfactory audition.

MUSC 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in music. May be taken up to two times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

MUSC 301 Performance in World Cultures
Credits 3. 3 Lecture Hours.
Application of the tools of performance studies to explore the enactment of the arts in world cultures and the ways the people of every society express themselves in performance; examination of different genres of performance through music, theatre, verbal art and dress.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: PERF 301 and THAR 301.

MUSC 311 Music in Early Western Culture
Credits 3. 3 Lecture Hours.
Survey of styles, genres, and forms in Western music, focusing on the lives and works of the principal composers from Greek antiquity to the end of the Baroque period within the context of political, social and cultural developments.
Prerequisite: MUSC 205 or approval of instructor.

MUSC 312 Music in Modern Western Culture
Credits 3. 3 Lecture Hours.
Survey of styles, genres, and forms in Western music, focusing on the lives and works of the principal composers from the middle of the eighteenth century to the present within the context of political, social and cultural developments.
Prerequisite: MUSC 205 or approval of instructor.

MUSC 315 Music in the 20th Century
Credits 3. 3 Lecture Hours.
The understanding and enjoyment of twentieth century music; survey of the broad panorama of the contemporary scene and an assessment of the forces that have shaped the musical climate we inhabit.
Prerequisite: MUSC 206 or approval of instructor.

MUSC 316 Music and Technology
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Study of music produced with the aid of electronic and computer technologies; critical listening and analysis of music literature; understanding of technical concepts; required laboratory provides creative practical experience in studio and live performance applications.
Prerequisite: Junior or senior classification and MUSC 206, PERF 202, or approval of instructor.

MUSC 317 Recording and the Producer
Credits 3. 3 Lecture Hours.
Tools and techniques of studio recording; the studio as compositional tool; recorded literature examining the creative and ideological impact of the producer; recording projects applying course techniques and exploring aesthetic concepts.
Prerequisite: MUSC 316 or approval of instructor.
MUSC 318/PERF 318 Electronic Composition
Credits 3. 3 Lecture Hours.
- Project-based study of techniques for creating electronic and mixed-media performance; critical analysis of important electronic and interactive works; interactive media programming techniques for sound and video synthesis, sampling, digital signal processing.
- **Prerequisites:** Junior or senior classification and MUSC 316, PERF 202, or approval of instructor.
- **Cross Listing:** PERF 318/MUSC 318.

MUSC 321 The Symphony Orchestra and Its Music
Credits 3. 3 Lecture Hours.
- The development of the symphony orchestra with particular attention to its vast musical repertory, and the colorful personalities associated with it; the organization and management of this musical institution including local arts support and volunteerism.
- **Prerequisite:** Approval of instructor.

MUSC 324/ANTH 324 Music in World Cultures
Credits 3. 3 Lecture Hours.
- Examination of music from an ethnomusicological perspective focusing on musical performance and the complex interrelationship of music to culture, society and daily life; examination of music from a variety of cultures through a series of case studies.
- **Prerequisite:** Junior or senior classification or approval of instructor.
- **Cross Listing:** ANTH 324/MUSC 324.

MUSC 325/PERF 325 Dance and World Cultures
Credits 3. 3 Lecture Hours.
- Examination of international relationships between dance, culture, identity, gender, youth and politics; relationships between dancing, gender and politics in specific cultures and in globalization; variety of dance practices around the globe.
- **Prerequisite:** Junior or senior classification.
- **Cross Listing:** PERF 325/MUSC 325.

MUSC 326 Dance and Identity in the United States
Credits 3. 3 Lecture Hours.
- Analysis of dance events as complex sites for social action; examines dances performed by diverse groups of people; considers such issues as identity, community, diversity, gender and representation in the United States.
- **Prerequisite:** Junior or senior classification.

MUSC 327 Popular Musics in the African Diaspora
Credits 3. 3 Lecture Hours.
- Examination of a range of popular musics from the twentieth century that have emerged in conjunction with the historical global spread of peoples and cultures from the African continent; technical knowledge about music is not required; focus on social and cultural contexts for popular music.
- **Prerequisite:** Junior or senior classification or approval of instructor.
- **Cross Listing:** AFST 327 and PERF 327.

MUSC 328/THAR 328 Japanese Traditional Performing Arts
Credits 3. 3 Lecture Hours.
- Study of various genres of Japanese performing arts from the 7th century to the present; understanding the genres in their historical and cultural contexts and recognizing shared aesthetic values.
- **Prerequisite:** Junior or senior classification or approval of instructor.
- **Cross Listing:** THAR 328/MUSC 328.

MUSC 345 Composition II
Credit 1. 2 Other Hours.
- Advanced instruction in composition; the writing of large-form musical compositions employing contemporary styles; techniques in writing for instrumental, vocal, electronic and mixed-media resources. May be repeated for credit.
- **Prerequisite:** MUSC 245 or approval of instructor.

MUSC 352
Credit 1. 2 Other Hours.

MUSC 353 Individual Performance: Guitar II
Credit 1. 3 Lab Hours.
- Advanced instruction in guitar performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.

MUSC 354 Individual Performance—Voice II
Credit 1. 2 Lab Hours.
- Advanced instruction in voice performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.

MUSC 355 Individual Performance—Keyboard II
Credit 1. 2 Lab Hours.
- Advanced instruction in keyboard performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be repeated for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.

MUSC 356 Individual Performance: String II
Credit 1. 3 Lab Hours.
- Advanced instruction in string performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.

MUSC 370 Individual Performance: Woodwind II
Credit 1. 3 Lab Hours.
- Advanced instruction in woodwind performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.

MUSC 371 Individual Performance: Brass II
Credit 1. 3 Lab Hours.
- Advanced instruction in brass performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.

MUSC 372 Individual Performance: Percussion II
Credit 1. 3 Lab Hours.
- Advanced instruction in percussion performance; broad range of literature with special emphasis on the historical and theoretical aspects that reveal the performance practices of specific periods; individual and group laboratory instruction. May be taken six times for credit.
- **Prerequisites:** Junior or senior classification and approval of instructor.
MUSC 386/THAR 386 Evolution of the American Musical
Credits 3. 3 Lecture Hours.
Examination of the American musical from its heterogeneous origins to a thriving and diverse expression of the human condition; analysis and critical discourse on the development of the American musical through text, audio and visual recordings.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: THAR 386/MUSC 386.
MUSC 400 Senior Seminar and Project
Credits 3. 3 Other Hours.
Culminating senior project on an individually-chosen research topic, presentation of a recital, or lecture-demonstration.
Prerequisites: Senior classification (completion of all 300- and 400-level coursework required for the B.A. in Music); music major status; approval of instructor, advisor, and department head.
MUSC 402 Intermedia Performance
Credits 3. 3 Lecture Hours.
Study of theory, history, literature and techniques of intermedia composition and design for film, theatre, dance, interactive media, and other forms of performance; examination of the collaborative creative process; projects in interdisciplinary performance.
Prerequisites: Junior or senior classification and MUSC 316, PERF 202, or approval of instructor.
Cross Listing: FILM 402 and PERF 402.
MUSC 424 Topics in Ethnomusicology
Credits 3. 3 Lecture Hours.
Study and application of ethnomusicological theory, method, and literature in a variety of historical and geographical contexts. May be taken four times for credit.
Prerequisite: Junior or senior classification.
MUSC 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Advanced directed study of identified topic in music. May be repeated for credit up to 6 credit hours.
Prerequisites: Approval of instructor and department head; 24 hours of music; MUSC majors and minors only.
MUSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of music. May be repeated for credit.
Prerequisite: Approval of instructor.
MUSC 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in music. May be taken two times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

NAUT - Nautical Science (NAUT)
NAUT 200 Basic Communications, Navigation and Seamanship
Credits 6. 6 Lecture Hours.
Basic Communications, Navigation and Seamanship. Practical application of student’s classroom studies aboard training ship during first training cruise. Student completes basic projects in communications, navigation, seamanship and rules of the road.
Prerequisites: MART 103, 203, 204 or permission of MART department head.
NAUT 300 Intermediate Communications, Navigation and Seamanship
Credits 6. 6 Lecture Hours.
Practical application of student’s classroom studies aboard training ship during second training cruise. Student completes intermediate projects in communications, navigation, seamanship, and rules of the road. Thorough study made of U.S. Public Health requirements in first aid.
Prerequisites: MART 200 or NAUT 200, 301, 303, METR 302, or permission of MART department head. Junior or senior classification or approval of instructor.
NAUT 400 Advanced Communications, Navigation and Seamanship
Credits 6. 6 Lecture Hours.
Practical application of student’s classroom studies aboard training ship during third training cruise. Student completes advanced projects in communications, navigation, seamanship and rules of the road.
Prerequisites: NAUT 200, 300, 302, 304 MART 321, 406. Junior or senior classification or approval of instructor.

NRSC - Neuroscience (NRSC)
NRSC 277/VIBS 277 Introduction to Neuroscience
Credits 3. 3 Lecture Hours.
Neuroscience from the molecular to system levels; fundamental principles and knowledge of neuroscience; current research information on neuroscience.
Prerequisites: Freshman or sophomore classification and approval of instructor.
Cross Listing: VIBS 277/NRSC 277.
NRSC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of neuroscience. May be repeated for credit.
Prerequisite: Approval of instructor.
NRSC 311/PSYC 311 Psychology of Animal Behavior
Credits 3. 3 Lecture Hours.
Problems, principles, and methods of animal psychology; animal learning, motivation, discriminative processes and abnormal, social and instinctual behaviors.
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.
Cross Listing: PSYC 311/NRSC 311.
NRSC 320/PSYC 320 Sensation-Perception
Credits 3. 3 Lecture Hours.
Review of sensory physiology, sensory and perceptual phenomena and the major perceptual theories; current research in the field.
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.
Cross Listing: PSYC 320/NRSC 320.
NRSC 331/PSYC 331 Social Neuroscience
Credits 3. 3 Lecture Hours.
Integration of biological and psychological explanations of social behavior; recent research and theories in social neuroscience; emotion, motivation, aggression, face processing, empathy, social cognition, and social relationships.
Prerequisites: PSYC 107 or approval of instructor; junior or senior classification.
Cross Listing: PSYC 331/NRSC 331.

NRSC 332/PSYC 332 Neuroscience of Learning and Memory
Credits 3. 3 Lecture Hours.
Brain mechanisms of learning and memory from molecular to behavioral levels; synaptic plasticity, model systems, multiple memory systems, diseases of learning and memory.
Prerequisites: PSYC 107 or approval of instructor; junior or senior classification.
Cross Listing: PSYC 332/NRSC 332.

NRSC 333/PSYC 333 Biology of Psychological Disorders
Credits 3. 3 Lecture Hours.
Neurobiology and clinical explanation of molecular mechanisms underlying psychiatric disorders and their drug treatments; depression and bipolar, anxiety disorders, mood disorders, psychosis and schizophrenia.
Prerequisites: PSYC 107, PSYC 335/NRSC 335 or one year of biology; junior or senior classification.
Cross Listing: PSYC 333/NRSC 333.

NRSC 335/PSYC 335 Physiological Psychology
Credits 3. 3 Lecture Hours.
Physiological bases of sensation, motor functions, emotion, motivation and complex psychological processes.
Prerequisites: 6 hours of biology; PSYC 301 and PSYC 302 or junior or senior classification.
Cross Listing: PSYC 335/NRSC 335.

NRSC 336/PSYC 336 Drugs and Behavior
Credits 3. 3 Lecture Hours.
Physiological, pharmacological and behavioral effects of psychoactive drugs, including short-term and long-term effects of psychoactive drugs, properties of addictive drugs, etiology of addiction, and treatments of drug addiction and withdrawal.
Prerequisites: PSYC 335/NRSC 335 or NRSC 335/PSYC 335; junior or senior classification.
Cross Listing: PSYC 336/NRSC 336.

NRSC 340/PSYC 340 Psychology of Learning
Credits 3. 3 Lecture Hours.
Survey of significant concepts, experimental methods and principles of learning.
Prerequisites: PSYC 107 or INST 301; PSYC 301 and PSYC 302 or junior or senior classification.

NRSC 350/PSYC 350 Science of Mind and Brain
Credits 3. 3 Lecture Hours.
Research in cognitive neuroscience; methodological advances that enable the study of the human brain safely in the laboratory; complex aspects of the mind like emotion, social behavior, and consciousness.
Prerequisite: Junior or senior classification.
Cross Listing: PSYC 350/NRSC 350.

NRSC 360/PSYC 360 Health Psychology and Behavioral Medicine
Credits 3. 3 Lecture Hours.
Health psychology emphasizing behavioral and lifestyle factors in health and illness, prevention and modification of health-compromising behaviors, health care utilization, and psychological management of chronic disorders and psychological management of chronic disorders and terminal illnesses.
Prerequisite: PSYC 107.
Cross Listing: PSYC 360/NRSC 360.

NRSC 401/VIBS 401 Developmental Neurotoxicology
Credits 2. 2 Lecture Hours.
Effects of exposure to toxic substances on the developing nervous system; content to include mechanisms of toxicity of substances potentially devastating to the developing nervous system including lead, mercury and other heavy metals, alcohol, nicotine (smoking), pesticides, flame retardants and others.
Prerequisite: Junior or senior classification.
Cross Listing: VIBS 401.

NRSC 407/VIBS 407 Core Ideas in Neuroscience
Credit 1. 1 Lecture Hour.
General overview of selected core ideas across the full spectrum of neuroscience.
Prerequisite: Junior or senior classification; background in science courses recommended.
Cross Listing: VIBS 407/NRSC 407.

NRSC 434/BIOL 434 Regulatory and Behavioral Neuroscience
Credits 3. 3 Lecture Hours.
Cell biology and biophysics of neurons; functional organization of the vertebrate nervous system; physiological basis of behavior.
Prerequisites: BIOL 213, BIOL 319, BIOL 388, NRSC 335/PSYC 335 or PSYC 335/NRSC 335.
Cross Listing: BIOL 434/NRSC 434.

NRSC 450/VIBS 450 Mammalian Functional Neuroanatomy
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Functional morphology of the domestic animal and human brain using gross specimens, microscopic sections, interactive computer-, DVD-, and video-assisted instructional programs supplemented with clinical case studies.
Prerequisites: Junior or senior classification; BIMS, biology, biochemistry, or psychology majors, or neuroscience minors with overall 3.5 TAMU GPA; or approval of instructor.
Cross Listing: VIBS 450/NRSC 450.

NRSC 485 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Directed readings or research problems in selected areas designed to supplement existing course offerings. Individual report required.
Prerequisite: Approval of instructor.

NRSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in an identified area of neuroscience. May be repeated for credit.
Prerequisite: Approval of instructor.

NRSC 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member in neuroscience. May be repeated 3 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.
NUEN - Nuclear Engineering (NUEN)

NUEN 101 Principles of Nuclear Engineering
Credit 1. 1 Lecture Hour.
Introduction to nuclear engineering including global and national energy requirements, radioactivity, radiation protection, and fission and fusion reactor concepts.

NUEN 102 Nuclear Engineering Practice
Credits 0. 0 Other Hours.
Participation in an approved high-impact learning practice; reflection on professional outcomes from engineering body of knowledge; documentation and self-assessment of learning experience at mid-curriculum point.
Prerequisite: NUEN 101.

NUEN 201 Introduction to Nuclear Engineering I
Credits 3. 3 Lecture Hours.
Atomic and nuclear physics discoveries that have led to the development of nuclear engineering, atomic models, relativity, x-rays, types of nuclear reactors; problem solving techniques.
Prerequisites: MATH 251 or registration therein; PHYS 208.

NUEN 265 Materials Science for Nuclear Energy Applications
Credits 3. 3 Lecture Hours.
Materials science fundamentals with an emphasis on nuclear applications; topics will include bonding, crystal structures crystalline defects, mechanical properties and radiation effects in metal, ceramic and polymer materials.
Prerequisites: CHEM 102, or CHEM 104 and CHEM 114, or CHEM 107; PHYS 218.

NUEN 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of nuclear engineering. May be repeated for credit.
Prerequisite: Approval of department head.

NUEN 301 Nuclear Reactor Theory
Credits 3. 3 Lecture Hours.
An introduction to neutron diffusion theory, neutron moderation, conditions for criticality of nuclear reactors.
Prerequisites: NUEN 302.

NUEN 302 Introduction to Nuclear Engineering II
Credits 3. 3 Lecture Hours.
Basic radioactivity, nuclear and neutron physics as applied to nuclear engineering.
Prerequisites: NUEN 201; MATH 308 or registration therein.

NUEN 303 Nuclear Detection and Isotope Technology Laboratory
Credits 2. 2 Lecture Hours. 3 Lab Hours.
Interaction of radiation with matter; behavior of various nuclear radiation detectors studied both theoretically and experimentally in laboratory; properties of radionuclides useful to industry considered and evaluated from engineering point of view; writing intensive course.
Prerequisites: NUEN 309/SENG 309; ECEN 215.

NUEN 304 Nuclear Reactor Analysis
Credits 3. 3 Lecture Hours.
The group diffusion method, multi-region reactors, heterogeneous reactors, reactor kinetics, changes in reactivity.
Prerequisite: NUEN 301; MATH 309.

NUEN 309/SENG 309 Radiological Safety
Credits 3. 3 Lecture Hours.
Interactions of nuclear radiations with matter and biological systems; theory and practice of radiation dosimetry as applied to radiation protection; design and application of radiation dosimetry systems for personnel monitoring, area radiation monitoring and accident situation; includes external and internal dosimetry as well as long-term risk analysis.
Prerequisite: NUEN 302.

NUEN 329 Analytical and Numerical Methods
Credits 3. 3 Lecture Hours.
Introduction to use of numerical analysis and advanced analytical techniques for obtaining nuclear reactor flux distributions, temperatures and transients; use of digital computer in obtaining nuclear reactor design information.
Prerequisites: MATH 309 and NUEN 301.

NUEN 405 Nuclear Engineering Experiments
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Experimental measurements of basic nuclear reactor parameters; reactor operation and reactor safety.
Prerequisites: NUEN 303; NUEN 304 or senior classification.

NUEN 406 Nuclear Engineering Systems and Design
Credits 3. 3 Lecture Hours.
Nuclear plant systems; conventional and advanced generation power reactors, nuclear simulators, transient analysis using available software for reactor simulators; nuclear engineering design methodology; problem formulation, criteria, trade-off decisions and design optimization; case studies.
Prerequisite: NUEN 304; MEEN 461 or approval of instructor.

NUEN 410 The Design of Nuclear Reactors
Credits 4. 4 Lecture Hours.
Application of reactor theory and other engineering disciplines in fundamental and practical design of nuclear reactor systems for power applications; use of computer in design operations.
Prerequisites: NUEN 304 and NUEN 406; MEEN 461.

NUEN 417/MEEN 417 Basics of Plasma Engineering and Applications
Credits 3. 3 Lecture Hours.
Basic plasma properties and confinement techniques; single particle orbits in electric and magnetic fields, moments of Boltzmann equation and introduction to fluid theory; wave phenomena in plasmas and introduction to plasma kinetic theory; analysis of laboratory plasmas and plasma applications including fusion, electric propulsion, materials processing and plasma enhanced chemistry.
Prerequisite: PHYS 208 or equivalent; senior classification in nuclear, mechanical, or aerospace engineering, physics, or approval of instructor.
Cross Listing: MEEN 417/NUEN 417.

NUEN 418 Fuel Assembly and 3-D Reactor Core Design and Modeling
Credits 3. 3 Lecture Hours.
Application of state-of-the-art engineering-grade codes in the neutronic design, analysis and modeling of nuclear fuel assembly and core.
Prerequisites: NUEN 304 and junior or senior classification.

NUEN 430 Computer Applications in Nuclear Engineering
Credits 3. 3 Lecture Hours.
Applications of digital computers to solve nuclear engineering problems; nuclear data and cross-section libraries; deterministic methods for linear and non-linear nuclear systems, and Monte Carlo methods for linear nuclear systems.
Prerequisites: NUEN 304, NUEN 329.
NUEN 431 Technical Communications Issues in the Nuclear Industries
Credit 1. 1 Lecture Hour.
Introduction to a variety of topics that present communication challenges; opportunities to learn from a variety of visiting experts concerning the nuances and challenges of, as well as successful methods for, communicating with concerned audiences about technically challenging topics.
Prerequisite: Junior or senior classification or approval of instructor.

NUEN 432 Nuclear Power Plant Fundamentals
Credits 3. 3 Lecture Hours.
Understanding the operation of a nuclear electric general station; includes reactor water chemistry, material science, electrical science; mechanical science, civil engineering for nuclear power plant engineers, and digital process control systems.
Prerequisite: Junior or senior classification in the college of engineering; non-NUEN majors.

NUEN 433 Nuclear Power Plant Systems – Pressurized Water Reactor
Credits 3. 3 Lecture Hours.
Principal elements of pressurized water reactor nuclear power systems; overview of reactor physics, thermodynamics, and heat transfer; focus on systems with both function and interfaces stressed throughout; includes basic reactor physics, reactor heat generation, reactor plant systems; support systems, and reactor safety.
Prerequisites: NUEN 431 and junior or senior classification in the college of engineering; non-NUEN majors.

NUEN 434 Nuclear Power Plant Systems – Boiling Water Reactor
Credits 3. 3 Lecture Hours.
Principal elements of boiling water reactor nuclear power systems; overview of reactor physics, thermodynamics, and heat transfer; focus on systems with both function and interfaces stressed throughout; includes basic reactor physics, reactor heat generation, reactor plant systems, support systems, and reactor safety.
Prerequisites: NUEN 431 and junior or senior classification in the college of engineering; non-NUEN majors.

NUEN 435 Nuclear Power Plant Operations
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Overview of mass, momentum and energy conservation as it relates to nuclear power plants; includes coupled neutronic/thermal models to study plant operations semi-quantitatively achieving an integrated plant understanding.
Prerequisites: NUEN 431, and NUEN 432 or NUEN 433; junior or senior classification in the college of engineering, non-NUEN majors.

NUEN 436 Human Performance for Nuclear Power Plant Engineers
Credits 2. 2 Lecture Hours.
Six modules: human performance fundamentals, the organization and the processes, the individual worker, the engineer, corrective action programs and root cause analysis, and case studies including TMI-2, Chernobyl, Davis-Besse, and Fukushima Daiichi.
Prerequisites: NUEN 432; junior or senior classification in the college of engineering.

NUEN 451 Nuclear Security System Design
Credits 3. 3 Lecture Hours.
The science and engineering associated with the design, evaluation and implementation of systems to secure nuclear and radiological materials; adversary characterization, categorization of nuclear and radiological targets, calculation of consequences associated with failure to protect targets, detection and delay technologies, and mathematical methods for evaluation and managing risk.
Prerequisites: NUEN 303 and NUEN 309/SENG 309 or equivalent, or approval of instructor.

NUEN 460 Nuclear Plant Systems and Transients
Credits 3. 3 Lecture Hours.
Use of engineering principles to elucidate the nuclear, mechanical, electrical and functional interactions among nuclear plant components and systems; reactor protection systems, alarm and trip setpoints, normal and accident transients. Components studied in detail include: core, control rod drive mechanism, neutron source, neutron detectors, primary coolant system, and emergency core cooling system.
Prerequisites: NUEN 301, NUEN 302, NUEN 304, NUEN 406, NUEN 430 or equivalents; MEEN 315, MEEN 344, MEEN 461 or equivalents; junior or senior classification.

NUEN 465 Nuclear Materials Engineering
Credits 3. 3 Lecture Hours.
Explore applications of materials science principles in nuclear energy systems; includes crystal structures and defects, metallurgy, and materials thermochemistry; emphasis on nuclear fuel performance, structural material changes, and waste materials; laboratory demonstrations on materials behavior.
Prerequisites: NUEN 265, MEEN 222/MSEN 222 or equivalent and NUEN 302.

NUEN 475 Environmental Nuclear Engineering
Credits 3. 3 Lecture Hours.
Environmental aspects of nuclear power; natural radiation environment and the distribution of radioactivity added to the environment by human activities; evaluation of effects of radiation and radioactivity on the environment and on humans.
Prerequisite: NUEN 309/SENG 309.

NUEN 479 Radiation Protection Engineering
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Analysis of radiation hazard situations and design of nuclear facilities from a safety standpoint.
Prerequisite: NUEN 475.

NUEN 481 Seminar
Credit 1. 1 Lecture Hour.
Designed to broaden the student’s capability, performance and perspective in nuclear engineering through faculty, student and guest presentations.
Prerequisite: NUEN 410 or registration therein or NUEN 479 or registration therein.

NUEN 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Problems of limited scope approved on an individual basis intended to promote independent study; program enrichment for capable students; results presented in writing to staff.
Prerequisites: Junior or senior classification and approval of department head.
NURS - Nursing (NURS)

NURS 301 Nursing Foundation
Credits 2. 1 Lecture Hour. 1 Lab Hour.
Introduction to nursing skills including such activities as safety, assessment of vital signs, comfort measures, assistance with daily living activities, environmental concerns, positioning and transporting. We will become familiar with the nursing process, communication and documentation tools. An introduction to the simulation center is highlighted in this class. Orientation to clinical sites and expectations for clinical rotation, as well as mandatory clinical site requirements will be completed.
Prerequisites: Admission to the BSN program or approval from the Associate Dean for Academic Affairs.

NURS 305 Nursing Dimensions and Informatics
Credits 3. 3 Lecture Hours.
This course explores the concepts of informatics and professional dynamics in nursing. Basic computer competencies essential to nursing are introduced, along with skills required to locate and evaluate information (info literacy), and process and communicate findings (info management) related to evidence-based nursing practice. The roles and behaviors of the professional nurse are also introduced. The influence of ethics and cultural/society issues on the nursing profession are explored as well as opportunities for personal and professional development.
Prerequisites: Admission to the BSN program or approval from the Associate Dean for Academic Affairs.

NURS 312 Introduction to Pathophysiology
Credits 3. 3 Lecture Hours.
An introduction to pathophysiological alterations in major regulatory mechanisms of the body. Provides a foundation for understanding general nursing practice, various diagnostic procedures and selected therapeutic regimens.

NURS 313 Nursing Fundamentals
Credits 5. 3 Lecture Hours. 2 Lab Hours.
An introduction to the scope of human needs, utilization of the nursing process as a systematic approach to meeting those needs and the role of the professional nurse in assisting individuals toward optimal health. Clinical settings are utilized in the application of fundamental concepts, principles of nursing and communication skills that are employed in providing basic client care.
Prerequisite: Admission to the BSN Program.

NURS 314 Health Assessment
Credits 3. 1 Lecture Hour. 2 Lab Hours.
Concepts and principles underlying assessment of the health status of individuals are presented. Emphasis is placed on interviewing skills, health histories, and the physical and psychosocial findings in the well person. Development of communication in the nurse-client relationship and assessment skills are included. Students implement the nursing process by obtaining health histories, performing physical and psychosocial assessments, establishing a database, and formulating initial nursing plans.

NURS 315 Nursing and the Aged
Credits 3. 2 Lecture Hours. 1 Lab Hour.
This course presents an overview of age-related changes including physical, emotional, social and environmental transitions in the aging family. Emphasis is placed on developmental patterns and health promotion in the population.

NURS 316 Pharmacology Principles
Credits 3. 3 Lecture Hours.
Focuses on the basic drug classifications, concepts and principles of pharmacology, with special consideration for the nursing role in developing a comprehensive approach to the clinical application of drug therapy through the use of the nursing process. Nursing implications relative to the utilization of drug therapy are examined.

NURS 320 Adult Nursing I
Credits 6. 3 Lecture Hours. 3 Lab Hours.
This course introduces the student to the use of the nursing process in the care of adults with chronic or non-complex illness. The course uses a systems approach to discuss the effects of illness on individual and family, and to examine the disruption of growth and development patterns across the lifespan from young adult to senior years, emphasizing the nursing process to assist adults in reaching their optimal level of wellness. The course includes clinical laboratory to allow the student the opportunity to apply theoretical concepts to clinical practice in diverse adult populations.

NURS 323 Nursing Care of Women, Families and Newborns
Credits 4. 2 Lecture Hours. 2 Lab Hours.
A study of childbearing families and women's health in normal and high-risk situations. The role of the nurse in meeting health needs of women, families and their newborns is analyzed. Supervised clinical experiences and/or simulation experiences in the application of the nursing process in meeting those health needs are offered. This course promotes acquisition of skills in caring for women, families and newborns during uncomplicated and/or complicated health experiences in a variety of settings.
Prerequisites: NURS 312, NURS 313, NURS 314, NURS 316.

NURS 385 Directed Studies
Credits 1 to 3. 1 to 3 Other Hours.
Individually supervised study in subject matter to be arranged with faculty.
Prerequisite: Admission to the College of Nursing or approval from the associate dean of academic affairs.

NURS 386 Directed Clinical Studies
Credits 1 to 3. 1 to 3 Other Hours.
Individually supervised study focusing on clinical skills in focused areas to be arranged with faculty.
Prerequisite: Admission to the College of Nursing or approval from the associate dean of academic affairs.
NURS 405 Selected Topics in Nursing
Credit 1. 1 Lecture Hour.
A broad introduction to selected topics of current interest in the role of professional nursing.

NURS 411 Evidence-Based Practice for Nurses
Credits 3. 3 Lecture Hours.
A study of the principles and methodology of research in nursing practice, with emphasis on evidence based practice research. Students will be expected to interpret research, identify its methods and significance, and analyze findings in order to be a consumer of nursing research and practitioner of evidence based practice.
Prerequisite: NURS 312, NURS 313, NURS 314, NURS 316, or with approval from the Associate Dean of Academic Affairs.

NURS 412 Care of Mental Health Clients
Credits 4. 2 Lecture Hours. 2 Lab Hours.
Care of Mental Health Clients. Demonstrates the relevance of psychosocial nursing concepts to all areas of professional practice. Provides a conceptual integration of the nursing process, theories and research from psychosocial sciences and humanities as these relate to the care of persons with mental disorders. Clinical experience provides an opportunity for application of psychosocial concepts and methods in using the nursing process to promote optimal levels of wellness for individuals, families and target groups.
Prerequisites: NURS 312, NURS 313, NURS 314, NURS 316.

NURS 413 Nursing Care of Children and Families
Credits 4. 3 Lecture Hours. 1 Lab Hour.
A study of the factors influencing health promotion, protection and maintenance of infants, children and adolescents. Family theory, growth and development, primary health care, and acute, chronic, and terminal conditions are examined. Clinical experience is provided in caring for healthy, at-risk, acutely and chronically ill infants, children, adolescents and their families.
Prerequisites: NURS 312, NURS 313, NURS 314, NURS 316.

NURS 420 Adult Nursing II
Credits 6. 6 Lecture Hours.
This course presents to the senior students critical thinking and problem-solving strategies for care of adults with acute or complex illness and injury. The effects of acute illnesses are examined in relation to the injury and in relation to the individual’s developmental stage, culture and gender. Building on Nursing Care of Adults I, a systems approach is used to analyze and intervene in alterations to the health of the individual and family and to help them reach their optimal level of wellness. This course includes clinical laboratory to allow the student the opportunity to integrate theoretical concepts to clinical practice in diverse populations.
Prerequisite: NURS 312, NURS 313, NURS 314, NURS 316, NURS 320.

NURS 421 Care of Community Health Clients
Credits 5. 5 Lecture Hours.
The nursing process is utilized in the study of community/public health nursing practice and common health problems encountered in community settings. Health promotion, maintenance, counseling and coordination of care are utilized in providing care to individuals, families, aggregates and populations in community settings. Principles and skills of public health nursing practice are used to assess a community’s health and diagnose community health needs.
Prerequisite: NURS 312, NURS 313, NURS 314, NURS 316.

NURS 424 Professional Issues
Credits 2. 2 Lecture Hours.
The purpose of this course is to introduce health professions students to professional and ethical/legal issues in everyday practice in health care, develop self-awareness skills about their own values, and those of others, and provide them with tools to engage in self-reflective practice leading to enhancement of patient-centered care and collaborative team work.
Prerequisites: Admission to the College of Nursing.

NURS 430 Transition to Professional Nursing Practice
Credits 5. 3 Lecture Hours. 2 Lab Hours.
Course reflects content that will prepare senior students for transition of entry into practice. Theories and principles concerning human behavior in organizations, with emphasis on leadership roles encountered in professional nursing practice. Senior nursing students in collaboration with nursing faculty refine coordination of care for a diverse population of clients. A clinical practicum will focus on synthesizing and refining skills in the delivery and management of nursing care to various groups of clients. Concepts of clinical decision-making, and inter-professional dynamics are incorporated in the context of legal, ethical, and evidence-based practice.
Prerequisites: NURS 301, NURS 305, NURS 313, NURS 314, NURS 315, NURS 320, NURS 411, NURS 412, NURS 420.

NURS 431 Care of Vulnerable Populations
Credits 1 to 3. 1 to 3 Lecture Hours.
Principles of caring for vulnerable populations; includes characteristics of the vulnerable, clinical issues associated with caring for individuals from vulnerable populations, social justice and resilience; activities include development of care plans for the vulnerable, teaching projects and capacity building; option to utilize 16 hours of community health clinical time to complete a mini-immersion experience.
Co-requisite: NURS 421.

NURS 432 Relations in Healthcare: Teamwork and Communication
Credits 1 to 3. 1 to 3 Lecture Hours.
Preparation for inter and intra professional teamwork and communication to improve the culture for professional collaboration with a shared mental model for excellence in quality and safety; goal for effective teamwork and communication is higher quality, safer patient care through highly effective medical teams that optimize the use of resources, information, and people to achieve the best clinical outcomes for patients.

NURS 434 Case Studies in Patient Safety and Quality
Credits 2. 2 Lecture Hours.
Application of evidence based quality improvement and risk reduction tools and strategies to various case studies with the goal of improving patient safety, outcome, and quality of care; case study evaluation of nursing practice and evidence based practice recommendations which highlight the nurse’s professional role in patient safety and quality; application of intra/interprofessional communication and teamwork skills to promote a safe environment for healthcare delivery.
Prerequisite: Junior or senior classification.
NURS 456 Complementary and Alternative Medicine/Health Care
Credits 3. 3 Lecture Hours.
This course is an introduction to the practice of complementary and alternative medicine (CAM)/health care. It will explore both conventional health care and CAM allowing the student to examine each of the entities to gain an understanding of what each practice offers. This knowledge will allow the future health care professional to better inform and facilitate the individual’s move toward or maintenance of optimal health and health practices. Alternative health care modalities, such as herbal medicine, acupuncture and massage therapy, will be discussed. Websites and online resources pertinent to the topic will be explored and analyzed, including the National Center for Complementary and Alternative Medicine within the National Institutes of Health.

NURS 457 Introduction to Concepts of Forensic Nursing
Credits 3. 3 Lecture Hours.
This course provides an introduction to forensic science as a collaborative approach to criminal investigation. General concepts and principles of forensic science will be explored with an emphasis on the role of the nurse working with victims of violence. Content to be addressed includes: forensic investigation, evidence collection and management, mechanisms of injury and death using post-mortem forensic analysis, interpersonal crimes of violence, and forensic nursing roles.

NURS 460 Nursing Dimensions and Informatics for the RN
Credits 3. 3 Lecture Hours.
This course is designed to build on the informatics knowledge and skills of the practicing nurse. Emphasis is placed on the application of the ANA Standards for Nursing Informatics and Professional Practice and incorporation of information technology to support patient care and clinical decision-making. The course will assist the students to develop the professional role by incorporation of the philosophy of nursing, nursing theory, and clinical reasoning. The nurse’s role in interprofessional practice will be explored. The influence of ethics and cultural/society issues on the nursing profession are explored as well as opportunities for personal and professional development.

NURS 461 Application of Evidence Based Practice for the RN
Credits 3. 3 Lecture Hours.
This course is a study of basic research methodologies and an in depth examination of the professional nurse’s role in the application of evidence into clinical practice.

NURS 462 Pathophysiology and Pharmacology for the RN
Credits 4. 4 Lecture Hours.
Students will demonstrate the ability to incorporate the principles of pathophysiology and pharmacology in planning healthcare for individuals across the lifespan.

NURS 463 Health Assessment for the RN
Credits 3. 3 Lecture Hours.
In this course, the concepts and principles underlying assessment of the health status of culturally diverse individuals are presented. An emphasis is placed on reviewing and renewing cognitive, affective, and psychomotor skills to obtain health histories and discover physical and psychosocial findings in the well person. The role of genetics in family histories is examined. Successful completion of the course requires students to successfully complete a head-to-toe health assessment examination with accurate documentation of the findings.

NURS 464 Health Promotion Across the Lifespan for the RN
Credits 3. 2 Lecture Hours. 1 Lab Hour.
This course emphasizes the role of the nurse in health promotion across multiple settings with diverse populations. The student will apply principles of teaching/learning, case management, and genetics/genomics to improve the health of general and vulnerable populations.

NURS 465 Care of the Older Adult for the RN
Credits 2. 2 Lecture Hours.
The student will develop competencies and knowledge necessary for providing care and promote health aging in the older adult.

NURS 466 Community Health for the RN
Credits 5. 4 Lecture Hours. 1 Lab Hour.
In this course, students are introduced to community-based health care of culturally diverse populations. The role of the professional nurse as part of an interprofessional team in health promotion, disease prevention, and management of chronic health problems in community settings is explored. Students apply critical reasoning and information technology skills to develop and implement evidence-based projects that positively impact the quality of life of populations. Practicum experiences are individualized.

NURS 467 Leadership and Management for the RN
Credits 5. 3 Lecture Hours. 2 Lab Hours.
In this course, theories and principles of human behavior in organizations are examined, including an exploration of leadership roles in professional nursing practice. The role of regulatory agencies in the provision of quality health care is explored. Students will participate in the evaluation and planning for quality improvement using nurse sensitive indicators. The students will discern the nurse’s role in reducing the financial cost of health care. Practicum experiences are individualized.

NURS 468 Professional Practice Issues for the RN
Credits 2. 2 Lecture Hours.
Professional practice issues such as those related to political action, socio-legal concerns, cultural diversity, and ethics are explored with an emphasis on the advocacy role of the nurse. The importance of the nurse leader as a role model for continued professional growth through lifelong learning is emphasized.

NURS 489 Special Topics In...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of nursing. May be repeated for credit.
Prerequisites: Admission to the BSN program or approval from the Associate Dean for Academic Affairs.

NUTR - Nutrition (NUTR)

NUTR 202 Fundamentals of Human Nutrition
Credits 3. 3 Lecture Hours.
(BIOL 1322, HECO 1322) Fundamentals of Human Nutrition. Principles of nutrition with application to the physiologic needs of individuals; food sources and selection of an adequate diet; formulation of Recommended Dietary Allowances; nutritional surveillance; for non-nutrition majors only.

NUTR 203 Scientific Principles of Human Nutrition
Credits 3. 3 Lecture Hours.
Chemistry and physiology of proteins, carbohydrates, lipids, vitamins and minerals; their ingestion, digestion, absorption, transport and metabolism.
Prerequisite: CHEM 101 and CHEM 111. Majors only.
NUTR 210/FSTC 210 Horizons in Nutrition and Food Science
Credits 2. 2 Lecture Hours.
Introduction to nutrition and food science career opportunities through presentations by nutrition and food science researchers and industry professionals; addresses issues of professionalism including portfolio development, teamwork, and critical thinking skills.

NUTR 211 Scientific Principles of Foods
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Basic principles underlying selection, preparation and preservation of food in relation to quality standards, acceptability and aesthetics. Introduction to composition, nutritive value, chemical and physical properties of foods; introduction to experimental study of foods.
Prerequisites: CHEM 101, CHEM 111; NUTR 202 or NUTR 203; sophomore classification or above.

NUTR 222 Nutrition for Health and Health Care
Credits 3. 3 Lecture Hours.
Analysis of nutrition with emphasis on providing a basic understanding of nutrition and its role in disease prevention and treatment.

NUTR 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study of selected problems in the area of nutrition.
Prerequisites: Approval of instructor; 2.0 GPR in major and overall.

NUTR 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of nutrition. May be repeated for credit.
Prerequisite: Approval of department head.

NUTR 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in nutrition. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

NUTR 300/FSTC 300 Religious and Ethnic Foods
Credits 3. 3 Lecture Hours.
Understanding religious and ethnic foods with application to product development, production, and nutritional practices; emphasis on different food rules and priorities with attention given to different religious and ethnic groups within the US and around the world.
Prerequisites: Junior or senior classification or approval of instructor; basic knowledge of food science and nutrition helpful.
Cross Listing: FSTC 300/NUTR 300.

NUTR 301 Nutrition Through Life
Credits 3. 3 Lecture Hours.
Analysis of nutrition with emphasis on human biological needs through stages of the life cycle; biochemical, physiological and anthropometric aspects of nutrition.
Prerequisites: NUTR 203; junior classification or approval of department head.

NUTR 303/ANSC 303 Principles of Animal Nutrition
Credits 3. 3 Lecture Hours.
Scientific approach to nutritional roles of water, carbohydrates, proteins, lipids, minerals, vitamins, and other dietary components; emphasis on the comparative aspects of gastrointestinal tracts and on digestion, absorption, and metabolism of nutrients.
Prerequisites: ANSC 107 and ANSC 108; CHEM 222 or CHEM 227 or equivalent.
Cross Listing: ANSC 303/NUTR 303.

NUTR 304 Food Service Systems Management
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Principles of food service management used in selecting, storing, preparing and serving food in quantity; emphasis on menu planning, quality control, purchasing, equipment and layout/design; application of basic food service systems management principles, including financial planning and personnel issues.
Prerequisites: NUTR 203 and NUTR 211, junior or senior classification.

NUTR 306 Understanding Obesity: A Social and Scientific Challenge
Credits 3. 3 Lecture Hours.
Perspectives of obesity in food science, nutrition, health and psychology; study of obesity factors in relation to genetics, exercise physiology and sociology with emphasis on food and nutrition.
Prerequisites: Junior or senior classification or approval of instructor.

NUTR 308 Nutritional Physiology of Vitamins and Minerals
Credits 3. 3 Lecture Hours.
Fundamental nutritional significance of fat soluble and water soluble vitamins and minerals to human metabolism, cell biology and physiology; micro-nutrient groups as per metabolic function or biochemical and physiological actions; important dietary sources, absorption, storage, metabolism, (bio)chemistry, deficiency and toxicity of individual nutrients in this context and basis of DRIs.
Prerequisites: NUTR 203 and NUTR 301; junior or senior classification.

NUTR 404 Nutrition Assessment and Planning
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Methods of determining the nutritional status of individuals; dietary techniques; planning nutritional care including diet modification and/or nutrition support; nutrition counseling.
Prerequisites: NUTR 203, NUTR 211 and NUTR 301; junior classification or approval of department head.

NUTR 405 Nutritional Treatment of Disease
Credits 3. 3 Lecture Hours.
Nutritional intervention in pathological conditions, based on biochemical, physiological and psychological effects of disease state; current research in clinical nutrition.
Prerequisites: NUTR 203, NUTR 301; BIOL 319; BICH 410 or concurrent enrollment; senior classification or approval of instructor.

NUTR 410/FSTC 410 Nutritional Pharmacometrics of Food Compounds
Credits 3. 3 Lecture Hours.
Nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
Prerequisites: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 222 or CHEM 227 or approval of instructor; junior or senior classification.
Cross Listing: FSTC 410/NUTR 410.
NUTR 420 Supervised Research in Mediterranean Nutrition and Food Processing in Italy
Credits 3. 3 Other Hours.
Exploration of principles of Mediterranean diet, European nutrition regulatory aspects, wine-making and food processing in Italy.
Prerequisite: FSTC 201, NUTR 202 or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.
Cross Listing: FSTC 420.

NUTR 422 Food Processing for Sustainable Nutrition in Brazil
Credits 3. 3 Other Hours.
Sustainable nutrition and food processing in Brazil; hands-on learning at the Federal University of Vicosa, the Amazon Biotechnology Center, food processing plants and other research centers in the Amazon, central Brazil and Rio De Janeiro.
Prerequisites: FSTC 201, NUTR 202, or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.
Cross Listing: FSTC 422.

NUTR 430 Community Nutrition
Credits 3. 3 Lecture Hours.
Principles of assessing nutrition problems in populations and planning nutrition programs to promote health in communities including nutrition education and food and nutrition policy; introduction to food and nutrition assistance programs.
Prerequisites: NUTR 203 and NUTR 301; junior or senior classification.

NUTR 440/FSTC 440 Therapeutic Microbiology: Probiotics and Related Strategies
Credits 3. 3 Lecture Hours.
Topics relevant to alimentary (gastrointestinal) microbiology including (i) the "normal" intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant pharmabiotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne gastrointestinal pathogens; and (vi) fermented products as functional foods.
Prerequisites: Undergraduate survey course in microbiology or approval of instructor; junior or senior classification.
Cross Listing: FSTC 440/NUTR 440.

NUTR 450 Nutrition and Metabolism of Minerals
Credits 3. 3 Lecture Hours.
The role of minerals in living systems and the exploration of their multitude of functions; chemical properties of minerals and how that relates to function in cells and tissues; consequences of mineral deficiencies based on known functions; insight into experimental approaches used to assess minerals in a living environment.
Prerequisite: NUTR 203, BICH 303 or BICH 410 or approval of instructor.

NUTR 469/FSTC 469 Experimental Nutrition and Food Science Laboratory
Credits 4. 1 Lecture Hour. 6 Lab Hours.
Investigation of nutritional intervention in animal models of metabolic and psychological disorders (e.g. obesity and depression); investigational approaches: behavioral analyses; RNA and protein analyses; reverse transcription PCR.
Prerequisites: CHEM 227; CHEM 237; junior or senior classification or approval of instructor.
Cross Listing: FSTC 469/NUTR 469.

NUTR 470 Nutrition and Physiological Chemistry
Credits 3. 3 Lecture Hours.
Fundamentals of physiology, biochemistry and nutrition and their relationship to the organismic and cellular metabolism of animals; biochemical basis of hormonal action.
Prerequisites: NUTR 203; NUTR 301; BICH 410; senior classification or approval of department head.

NUTR 471/FSTC 471 Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews
Credits 3. 3 Lecture Hours.
Evaluation of scientific literature, research methods within the literature, and the quality of scientific studies to produce an evidence-based review in areas specific to nutrition and food science.
Prerequisites: NUTR 202 or NUTR 203 and STAT 302; junior or senior classification; knowledge of technical writing helpful.
Cross Listing: FSTC 471/NUTR 471.

NUTR 481 Seminar
Credit 1. 1 Lecture Hour.
Review of current literature and research in nutrition; oral presentations and critical discussions.
Prerequisite: NUTR 203; NUTR 301; senior classification or approval of department head.

NUTR 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study on selected problems in the area of nutrition.
Prerequisites: Junior or senior classification in scientific nutrition or allied area; approval of instructor; 2.0 GPR in major and overall.

NUTR 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of nutrition. May be repeated for credit.
Prerequisite: Junior or senior classification.

NUTR 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in nutrition. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.

NVSC - Naval Science (NVSC)

NVSC 101 Introduction to Naval Science
Credits 2. 2 Lecture Hours. 1 Lab Hour.
Seapower and the naval service; mission, organization, regulations, and broad warfare components of the Navy; overview of officer and enlisted rank and rating structures, procurement and recruitment, training and education, promotion and advancement, and retirement policies. Basic tenets of naval courtesy and customs, discipline, naval leadership, and ship's nomenclature. Major challenges facing Naval officers; areas of equal opportunity, fraternization and drug/alcohol abuse.

NVSC 200 Naval Science for the Merchant Marine Officer
Credits 3. 3 Lecture Hours.
(STCW Course). Organization of the U.S. Navy (including the U.S. Navy Control of Shipping Organization) with discussion of the Merchant Marine Naval Reserve commission in order to provide a sound basis for liaison between the U.S. Navy and the Merchant Marine. Seapower will be analyzed and naval damage control procedures and underway replenishment procedures will be introduced.
NVSC 205 Naval Sea Power and Maritime Affairs
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Nautical history survey emphasizing major developments in strategy, tactics, technology, and effects of political climate; significant naval engagements and officers; includes an introduction to the role of seapower in national policy and diplomacy; Mahan's naval strategy and the effects of maritime policy on global stability.

NVSC 210 Leadership and Management I
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Prerequisites: Junior or senior classification.
Principles of leadership and management and their application to duties and responsibilities for Junior Naval Officers; management theory, professional responsibility and human resource management programs; skills in leadership and management, communication, counseling, evaluations; administration of discipline developed through participation in case studies, experiential exercises and situational problems.

NVSC 301 Navigation
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Theory, principles and procedures of ship navigation in coastal and open ocean environments; piloting, ocean and tidal currents, weather, introduction to USN electronic and satellite navigational systems, guided participation in case studies involving maritime accidents.

NVSC 303 Evolution of Warfare
Credits 3. 3 Lecture Hours.
Art and concepts of land warfare; its evolution from the beginning of recorded history to present day; influence that leadership, political, economic, sociological and technological development have had on warfare throughout history.

NVSC 320 Naval Ships Systems I: Engineering
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Study of engineering concepts and their application in U.S. Naval vessels; basic ship design, hydrodynamic forces, fluid dynamics, stability, propulsion, closed thermodynamic systems, electrical systems, shipboard power generation and distribution, shipboard safety, organization and firefighting.
Prerequisites: Junior or senior classification.

NVSC 401 Naval Ships Systems II: Weapons
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Types and purpose of major weapons systems and platforms of the U.S. Naval forces; theory and operational principles of radar, sonar and communication circuits; fire control problem geometry, principles of ballistics, propulsion, launching and guidance of weapons; principles of electronic warfare and nuclear weapons.

NVSC 402 Leadership and Ethics
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Theoretical concepts of Western moral traditions and ethical philosophy; topics include leadership, values, military ethics, Just War Theory, Uniform Code of Military Justice and Naval regulations; examination of ethical foundation for the development of leadership and communication skills; should be taken the semester of graduation.

NVSC 404 Naval Operations and Seamanship
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Relative motion, formation tactics, ship maneuvering behavior and characteristics, applied aspects of ship handling, afloat communications and ship employment; naval warfare, operations concepts, command and control, and joint warfare; review and analysis of case studies involving moral, ethical and leadership issues.
Prerequisite: NVSC 301; junior or senior classification.

NVSC 410 Amphibious Warfare
Credits 3. 3 Lecture Hours.
Historical survey of the projection of seapower ashore; background of military history with emphasis on Marine Corps contributions; selected amphibious operations and the evolution of current amphibious doctrine. Development of concepts, principles and techniques of amphibious operations.
Prerequisite: NVSC 303.

NVSC 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study in problems in the field of naval science not covered by other courses in department.
Prerequisite: Approval of department head.

OCEN - Ocean Engineering (OCEN)

OCEN 100 Introduction to Offshore and Coastal Engineering
Credits 2. 2 Lecture Hours.
Introduction to offshore and coastal engineering principles with emphasis on offshore structures, underwater pipelines, floating production systems, current advances in offshore technologies; coastal structures, coastal processes, port and harbor design and advances in ocean/wind energy technologies.
Prerequisites: MATH 151 or concurrent enrollment; freshman and sophomore classification.

OCEN 201 Introduction to Ocean Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Survey of ocean engineering; concepts and theories of wave-structure interaction; sources of technical information; coastal and ocean structures, moorings, laboratory models; underwater systems; naval architecture; ocean instrumentation; materials and corrosion; hydrographic surveying and positioning, graphics laboratory, recent developments in ocean engineering.
Prerequisite: OCEN 221 or concurrent enrollment.

OCEN 210 Properties of Engineering Materials
Credit 1. 3 Lab Hours.
Atomic and crystalline structures of materials; mechanical properties, failure, corrosion and thermal processes of metallic materials; tensile, hardness, impact and torsion testing of metal alloys.
Prerequisites: ENGR 212, ENGR 221 and PHYS 208.

OCEN 212 Engineering Science in Thermodynamics
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Theory and application of thermodynamics as an engineering science; applications of the laws of thermodynamics and energy equations to heat transfer and flow.
Prerequisites: ENGR 221 and MATH 251 or concurrent enrollment.

OCEN 213 Principles of Materials Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Description of properties of materials using a unified approach; discussion of the chemical structure, crystalline structure, microstructure, interface structure, and phase diagrams for materials; develop bulk properties and characteristics of metals, polymers, and ceramics; mechanical, electrical, magnetic, thermal, and optical properties for these materials.
Prerequisites: CHEM 107, CHEM 117; OCEN 221; OCEN 216; PHYS 208; MATH 308 or concurrent enrollment.
OCEN 214 Mechanics of Deformable Bodies
Credits 3. 3 Lecture Hours.
Concepts of stress, strain and deformation; factor of safety; stress-strain relationships and material properties; stress concentrations; area moments of inertia; axially loaded members, torsionally loaded members, bending of beams; shear and moment diagrams; stresses due to combined loading; thin-walled pressure vessels; transformation of stress including Mohr's circle; beam deflections and buckling stability.
Prerequisites: ENGR 221; MATH 308 or concurrent enrollment.

OCEN 215 Principles of Electrical Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamentals of electric circuit analysis, AC power, and electronics; intended as a terminal course in these areas for most engineering disciplines.
Prerequisites: PHYS 208, MATH 308 or concurrent enrollment.

OCEN 216 Principles of Thermodynamics
Credits 2. 2 Lecture Hours.
Theory and application of thermodynamics as an engineering science; study of work, heat and energy as applied to open and closed systems; introduction to entropy, reversible and irreversible processes; intended as a terminal course in these areas.
Prerequisites: ENGR 221 and MATH 251 or concurrent enrollment.

OCEN 217 Electrical Engineering: Circuits
Credits 2. 2 Lecture Hours.
Fundamental principles of electric circuit analysis, DC and AC electricity, electric power; designed to prepare for topical questions from the P.E. exam; intended as a terminal course in these areas.
Prerequisite: PHYS 208.

OCEN 221 Engineering Mechanics: Statics
Credits 2. 2 Lecture Hours. 2 Lab Hours.
General principles of mechanics; concurrent force systems; statics of particles; equivalent force/moment systems; centroids and center of gravity; equilibrium of rigid bodies; trusses, frames and machines; internal forces in structural members; moments of areas.
Prerequisites: ENGR 111; MATH 251 or MATH 253 or concurrent enrollment; PHYS 218; enrollment in OCSE or OCCL major degree sequence.

OCEN 261 Applied Numerical Methods
Credits 3. 3 Lecture Hours.
Application of numerical methods to ocean-related engineering problems; development, evaluation and comparison of various techniques for root finding, curve fitting, numerical integration, simultaneous linear algebraic equations, matrix methods, probability and statistics and ordinary differential equations in ocean-related engineering applications.
Prerequisites: MATH 308 or concurrent enrollment, ENGR 111, ENGR 112.

OCEN 265 Introduction to Geotechnical Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Physical properties of soils, classification systems, soil exploration, permeability, consolidation, compaction and shear strength; laboratory tests conducted to determine the physical and engineering soil properties needed for application in geotechnical engineering design. Enrollment in OCSE or OCSE.
Prerequisite: OCEN 221.

OCEN 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study on selected current problems in the ocean and/or maritime industry; enables individuals or groups to undertake and complete with credit some specialized investigation not covered by other courses.
Prerequisite: Approval of department head.

OCEN 300 Ocean Engineering Wave Mechanics
Credits 3. 3 Lecture Hours.
Physical and mathematical fundamentals of ocean wave behavior; mechanics of wave motion; use of statistics and probability to develop design wave criteria.
Prerequisite: CVEN 311, OCEN 201 or concurrent enrollment.

OCEN 310 Engineering Analysis
Credits 3. 3 Lecture Hours.
Application of numerical methods to ocean-related engineering problems; development, evaluation, and comparison of various techniques for root finding, curve fitting, numerical integration, simultaneous linear algebraic equations, matrix methods, probability and statistics, and ordinary differential equations in ocean-related engineering applications.
Prerequisites: Junior or senior classification or approval of instructor; MATH 308 or concurrent enrollment; ENGR 111 and ENGR 112.

OCEN 319 Naval Architecture Design I
Credits 2. 2 Lecture Hours. 3 Lab Hours.
Introduction to Naval Architecture; terminology; hydrostatics and hydrostatic stability; processes of the design of ships, semi-submersibles and underwater vehicles including layout, arrangements, construction and construction techniques; hull design of ships, underwater vehicles and mobile offshore drilling units (MODUs).
Prerequisites: CVEN 311 and CVEN 345 or concurrent enrollment; OCEN 221 and OCEN 214 or concurrent enrollment; junior or senior classification or approval of instructor; enrollment in OCEN major degree sequence.

OCEN 336 Fluid Dynamics Laboratory
Credit 1. 2 Lab Hours.
Introduction to laboratory techniques, calibration principles, reports and fluid measurements; determination of fluid properties; visualization of types of flow; experiments in closed conduit flow of air, water and oil; fluid drag and turbomachinery tests; open channel and gravity wave demonstrations.
Prerequisite: CVEN 311 or concurrent enrollment.

OCEN 341 Engineering Economics and Project Management
Credits 3. 3 Lecture Hours.
Analysis of engineering economics and management, using costs and benefits of various engineering options; project scheduling covered in detail including PERT, GANT and CPM methods; time value of money, cash flows, analysis techniques, interest rates, inflation, depreciation, optimization, statistics, network analysis and critical path programming.
Prerequisites: Junior or senior classification; enrollment in the OCEN program.

OCEN 344 Reinforced Concrete Structures
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Analysis and design of reinforced concrete beams, columns, slabs and footings using ultimate strength methods.
Prerequisites: Enrollment in OCEN program; CVEN 345.
OCEN 362 Hydromechanics  
Credits 3. 3 Lecture Hours.  
Kinematics of fluids; differential analysis of fluid flow; incompressible,  
irrotational and turbulent flow; Navier-Stokes equations; flow of viscous  
fluids; open-channel flow.  
Prerequisites: CVEN 311; MATH 308; junior or senior classification.

OCEN 363 Dynamics and Vibrations  
Credits 3. 3 Lecture Hours.  
Application of Newtonian and energy methods to model dynamic  
systems with ordinary differential equations; dynamics and vibrations of  
linear single- and multi-degree of freedom systems of particles and rigid  
structures; mooring and towing analysis; fluid-structure interactions;  
vehicles; applications to the design consideration of semi-submersibles,  
concepts of linear structural dynamics and to the design of ocean  
and damaged stability; resistance and propulsion of water-borne  
hydrostatics; load line and classification regulations; concept of intact  
curriculum point.  
Prerequisites: OCEN 221 with a grade of C or better; MATH 308 with C or  
better, OCEN 261; enrollment in OCSE major degree sequence and junior  
or senior classification.

OCEN 399 Leadership and Experience  
Credits 0. 0 Other Hours.  
Participation in an approved high-impact learning practice; reflection  
on professional outcomes from engineering body of knowledge;  
documentation and self-assessment of learning experience at mid-  
curriculum point.  
Prerequisites: OCEN 201; junior or senior classification or approval of  
instructor.

OCEN 400 Basic Coastal Engineering  
Credits 3. 3 Lecture Hours.  
Mechanics of wave motion; wave refraction, diffraction and reflection;  
wave forecasting; shore processes; planning of coastal engineering  
projects; design of seawalls, breakwaters, beach nourishment and fixed  
and floating installations; dredging; risk analysis.  
Prerequisites: OCEN 300 or approval of instructor; CVEN 311; junior or  
senior classification.

OCEN 401 Underwater Acoustics for Ocean Engineers  
Credits 3. 3 Lecture Hours.  
Fundamentals of underwater acoustics, SONAR equations, propagation  
of underwater sound, acoustic transducers and arrays, noise in the  
sea environment, design and prediction of SONAR systems, ocean  
engineering applications of underwater sound.  
Prerequisite: CVEN 311 or approval of instructor.

OCEN 402 Principles of Naval Architecture  
Credits 3. 3 Lecture Hours.  
Elementary principles of naval architecture; ship geometry and  
hydrostatics; load line and classification regulations; concept of intact  
and damaged stability; resistance and propulsion of water-borne  
vehicles; applications to the design consideration of semi-submersibles,  
catamarans and drilling rigs.  
Prerequisite: CVEN 311.

OCEN 403 Dynamics of Offshore Structures  
Credits 3. 3 Lecture Hours.  
Prediction of loads due to wind, current and waves; introduction to  
concept of linear structural dynamics and to the design of ocean  
structures; mooring and towing analysis; fluid-structure interactions;  
vibration of submerged structures; offshore pipelines; introduction to risk  
analysis.  
Prerequisites: OCEN 300 or approval of instructor; CVEN 345; OCEN 363  
or concurrent enrollment.

OCEN 405 Finite Element Analysis in Engineering Design  
Credits 3. 3 Lecture Hours.  
Introduction to the fundamental theory and techniques; direct approach  
and energy formulation; element equations, assembly and solution  
schemes; computer implementation, design considerations; applications  
to field problems; original computer project required.  
Prerequisites: CVEN 345, OCEN 214, OCEN 261; junior or senior  
classification or approval of instructor; enrollment in OCEN program.

OCEN 406 Capstone Design I  
Credit 1. 1 Lecture Hour.  
Part one of a two-course sequence; development and presentation of  
detailed proposals for offshore or coastal engineering projects, which  
will form the basis for MASE 407 design projects; includes formulation  
of project objectives, design constraints, delineation of alternatives,  
scheduling and analysis of economic and environmental impact.  
Prerequisites: OCEN 405, OCEN 415 and OCEN 463, or concurrent  
enrollment; ENGL 210; required 300-level engineering and technology  
courses; enrollment in OCSE major degree sequence.

OCEN 407 Design of Ocean Engineering Facilities II  
Credits 3. 0 Lecture Hours. 6 Lab Hours.  
Design of structures, equipment and systems for the ocean;  
environmental, logistical and reliability requirements; complete  
design process followed through group design project; delineation of  
alternatives, constraints, economics and environmental consequences  
incurred to strengthen real-life problem solving skills.  
Prerequisites: OCEN 400, OCEN 402, OCEN 403 and OCEN 406, or  
approval of instructor.

OCEN 408 Underwater and Moored System Design  
Credits 3. 3 Lecture Hours.  
Basic principles of thermodynamics, fluid dynamics and human  
respiration physiology applied to design of underwater habitats,  
submersibles and diving bells; breathing gas supply for diving systems;  
heat transfer for underwater systems; pressure vessel design; remotely  
operated vehicles; subsea flowlines and manifold systems; and design of  
towed and moored systems.  
Prerequisites: CVEN 311; MEEN 315 or approval of instructor.

OCEN 410 Ocean Engineering Laboratory  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Fundamental techniques and instrumentation for field and laboratory  
measurements pertaining to ocean engineering experiment planning;  
data analysis and data presentation; written reports describing planning,  
analysis and results of experiments.  
Prerequisites: OCEN 400, OCEN 402 and OCEN 403; junior or senior  
classification.

OCEN 411 Environmental Nearshore Hydrodynamics  
Credits 3. 3 Lecture Hours.  
Fundamentals of current and shallow water wave motions; beach  
response to nearshore processes; coastal sediment and pollutant  
transport including nearshore currents, longshore onshore-offshore  
transport and shoreline configuration; facilities for shoreline stabilization,  
backshore protection and inlet stabilization; environmentally conscious  
coastal engineering design.  
Prerequisites: OCEN 300; junior or senior classification or approval of  
instructor; enrollment in OCEN program.
OCEN 415 Offshore Structure Design  
Credits 3. 3 Lecture Hours.  
Design of large structures using diffraction analysis; design project:  
design of a fixed offshore structure including dynamics effects.  
Prerequisites: OCEN 463 or concurrent enrollment; OCEN 265, CVEN 446  
and OCEN 300; junior or senior classification or approval of instructor;  
enrollment in OCSE major degree sequence.

OCEN 421 Naval Architecture Design II  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Ship motion and mooring; theory and practice of naval architecture, basic  
principles and design calculations; hull structural design considerations;  
ship resistance and propulsion power prediction; propeller selection  
concepts; dynamic positioning systems; mobile offshore drilling unit  
(MODU) design considerations; practical design work on a vessel or  
MODU of the student’s choosing under the guidance of the instructor.  
Prerequisites: OCEN 319, CVEN 346, OCEN 462; junior or senior  
classification or approval of instructor; enrollment in OCEN program.

OCEN 459 Mechanical Vibrations  
Credits 3. 3 Lecture Hours.  
Basic theory of vibrating systems with single and multiple degrees of  
freedom and principles of transmission and isolation of vibrations.  
Prerequisites: OCEN 214, OCEN 221, OCEN 310; junior or senior  
classification or approval of instructor; enrollment in OCEN program.

OCEN 461 Ocean Instrumentation and Control Theory  
Credits 3. 3 Lecture Hours.  
Electrical systems components; analog and digital filters-amplifiers;  
network analysis; instrument behavior and displacement, velocity,  
acceleration, force, and flow measurements; simple feedback and control  
theory for linear electromechanical systems; digital data acquisition.  
Prerequisites: PHYS 208 and ENGR 215; junior or senior classification  
or approval of instructor; enrollment in OCEN program.

OCEN 463 Hydrodynamics of Offshore Structures  
Credits 3. 3 Lecture Hours.  
Introduction to offshore structures; wave force formulation; wave forces  
on small structures; floating structure dynamics; modeling dynamics  
systems of rigid body motion; structure response statistics.  
Prerequisites: Junior or senior classification or approval of instructor;  
OCEN 261, OCEN 363, CVEN 345 and OCEN 300; enrollment in OCEN program.

OCEN 465 Subsea Pipeline Design  
Credits 3. 3 Lecture Hours.  
Design and construction practices of submarine oil/gas pipelines and  
risers; pipe selections, coating, insulation; route selection; operation  
and installation stresses; stability during laying and operation due to wave  
and current action; cost analysis considering long term operability and safety.  
Prerequisites: CVEN 345, CVEN 365, CVEN 446, and OCEN 300.

OCEN 467 Offshore Random Processes  
Credits 3. 3 Lecture Hours.  
Basic probability theory and engineering statistics; irregular structural  
excitation and response; random vibration theory with application to  
offshore processes and structures; development of extreme values used  
in design of ocean structures.  
Prerequisites: OCEN 261, OCEN 301 and OCEN 363, or approval of  
instructor; enrollment in OCEN program.

OCEN 474 Port and Harbor Engineering  
Credits 3. 3 Lecture Hours.  
Engineering background and specific skills for design of marine facilities  
and harbors; includes development of design criteria, channel design,  
evaluation of operations and extreme loads, dredging and disposal.  
Prerequisites: Junior or senior classification or approval of instructor.

OCEN 475 Environmental Fluid Mechanics  
Credits 3. 3 Lecture Hours.  
Examines fluid and mass transport in naturally occurring flows; topics  
include molecular and turbulent diffusion; dispersion; river, estuary,  
and ocean mixing; dissolution boundary layers; tidal mixing; offshore  
and wastewater outfalls; introduction to environmental quality numerical  
modeling.  
Prerequisite: CVEN 311.

OCEN 481 Seminar  
Credit 1. 1 Lecture Hour.  
Responsibilities and obligations of new ocean engineers; professional  
ethics, membership in professional societies and professional  
registrations; case studies and lectures presented by staff and practicing  
engineers. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisite: OCEN 300 or concurrent enrollment.

OCEN 482 Seminar  
Credit 1. 1 Other Hour.  
State of technology topics in ocean engineering; professional ethics,  
membership in professional societies and professional registrations;  
case studies and lectures presented by staff and practicing engineers.  
Prerequisites: Junior or senior classification or approval of instructor;  
enrollment in OCEN program.

OCEN 483 Marine Foundation Analysis and Design  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Design of foundations for onshore, alongshore and offshore structures,  
including prediction of settlement and the bearing capacity of shallow  
and deep foundations; determination of earth pressure acting on  
retaining structures and design of steel and concrete bulkheads; design  
of pile foundations; design of cofferdams and caissons; laboratory tests  
done to determine the physical and engineering properties needed  
for application in geotechnical engineering design.  
Prerequisites: CVEN 345, CVEN 346, CVEN 365; junior or senior  
classification or approval of instructor; enrollment in OCEN program.

OCEN 485 Directed Studies  
Credits 1 to 6. 1 to 6 Other Hours.  
Special problems in various areas of ocean engineering assigned to  
individual students or to groups; readings and assignments given and  
frequent consultations held.  
Prerequisite: Approval of program head.

OCEN 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified field of ocean engineering. May be  
repeated for credit.  
Prerequisite: Approval of instructor.

OCEN 491 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of faculty member in ocean  
gineering. May be repeated 2 times for credit. Registration in multiple  
sections of this course is possible within a given semester provided that  
the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.
OCNG - Oceanography (OCNG)

OCNG 203 Communicating Oceanography Laboratory
Credit 1. 2 Lab Hours.
Learn and practice basic writing skills for ocean science; basic background on the research being conducted in the Department of Oceanography through seminars given by Oceanography graduate students.

OCNG 251 Oceanography
Credits 3. 3 Lecture Hours.
(GEOL 1345, GEOL 1445) Oceanography. Overview of the ocean environment; interrelation of the subdisciplines of ocean sciences; importance of the oceans to human beings; human impact on the oceans.

OCNG 252 Oceanography Laboratory
Credit 1. 2 Lab Hours.
(GEOL 1145, GEOL 1445) Oceanography Laboratory. Hands-on laboratory experiments and exercises demonstrating principles of ocean sciences; emphasis on the unique interdisciplinary nature of the ocean and current ocean issues relevant to today's society. Honors sections and contracts are also available.

OCNG 281 Seminar
Credit 1. 1 Lecture Hour.
Basic background on the research being conducted in the Department of Oceanography through seminars given by Oceanography graduate student; basic writing skills for ocean science through instruction and assignments during the semester.

Prerequisites: OCNG 251 or OCNG 401; OCNG 252; or approval of instructor.

OCNG 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in oceanography. May be repeated 2 times for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.

Prerequisites: Freshman or sophomore classification and approval of instructor.

OCNG 303 Professional Communication in Oceanography
Credits 3. 3 Lecture Hours.
Exploration of the fundamental skills required for effective communication of various forms of writing and for oral presentations of various lengths and purposes; addresses preparation for various ocean science-related careers.

Prerequisite: OCNG 203, COMM 203 or COMM 205, junior or senior classification or approval of instructor.

OCNG 350 Marine Pollution
Credits 3. 3 Lecture Hours.
Sources and fates of marine pollutants; types of pollutants including plastics, oil and sound; impact of pollution on society.

Prerequisite: Junior or senior classification or approval of instructor.

OCNG 401 Interdisciplinary Oceanography
Credits 3. 3 Lecture Hours.
Quantitative survey of interdisciplinary relationships between biological, chemical, geological/geophysical and physical aspects of the ocean. Honors section also available.

Prerequisites: MATH 131, MATH 151, or MATH 171; junior or senior classification; or approval of instructor.

OCNG 404 Ocean Observing Systems
Credits 3. 3 Lecture Hours.
Investigate the rationale behind ocean observing systems; familiarize with the relevant social, scientific design, technology and policy issues associated with observing systems.

Prerequisite: OCNG 251 or OCNG 401 or approval of instructor.

OCNG 410 Physical Oceanography
Credits 3. 3 Lecture Hours.
Elements of the physics of the sea; descriptive aspects as well as cause and effect relations in respect to currents, thermal structure and waves. Intended for majors in the physical sciences or engineering.

Prerequisites: MATH 152; junior or senior classification.

OCNG 420 Biological Oceanography
Credits 3. 3 Lecture Hours.
Biological aspects of the marine environment; marine organisms; productivity of the sea; marine pollution and fouling; use of the sea.

Prerequisites: BIOL 112 or OCNG 251; junior or senior classification.

OCNG 425 Microbial Oceanography
Credits 3. 3 Lecture Hours.
Diversity and ecology of microorganisms in the ocean; role in the Earth system both in the contemporary ocean and the geological past.

Prerequisites: Junior or senior classification, OCNG 251, or OCNG 401, or approval of instructor.

OCNG 430 Geological Oceanography
Credits 3. 3 Lecture Hours.
History of Oceanography; physiographic provinces of the oceans, their origins and sediments; geological sampling techniques and geophysical methods; coasts and beaches, paleoceanography; global tectonics.

Prerequisites: OCNG 251 or OCNG 401 or GEOL 101 or GEOL 104 or GEOG 203; junior or senior classification.

OCNG 440 Chemical Oceanography
Credits 3. 3 Lecture Hours.
Chemical aspects of the marine environment; biogeochemical cycles of organic and inorganic constituents; primary productivity, the carbon dioxide system, nutrient cycles, stable and radioactive isotopes in the sea.

Prerequisites: CHEM 102 or CHEM 104; junior or senior classification; sophomore with approval of instructor.

OCNG 443 Oceanographic Field and Laboratory Methods
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Development of skills needed to collect, prepare and analyze oceanographic samples; perform data analysis, interpretation and reporting for common oceanographic analyses.

Prerequisite: MATH 152, CHEM 102, junior or senior classification or approval of instructor.

OCNG 451 Mathematical Modeling of Ocean Climate
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Problem-based course in theoretical and computer techniques applied to mathematical solutions of ocean climate, including ocean circulation, climate variability, El Niño.

Prerequisite: MATH 308 or MATH 451.
OCNG 453 Hydrothermal Vents and Mid-Ocean Ridges  
Credits 3. 3 Lecture Hours.  
Exploration of the creation of various types of hydrothermal fluids, the associated chemical behavior of vent and plume fluids, and the ecology of hydrothermal vent systems; emphasis on the interdependence of the geological, chemical, and biological aspects of hydrothermal systems.  
Prerequisite: OCNG 251 or OCNG 401, junior or senior classification or approval of instructor.

OCNG 456 MATLAB Programming for Ocean Sciences  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Computation techniques for oceanographic data processing using MATLAB; focus on the analysis of oceanographic-related data sets and real-world oceanographic applications; analyze individual data sets.  
Prerequisite: Junior or senior classification or approval of the instructor.

OCNG 461 Advanced Oceanographic Data Analysis and Communication  
Credits 3. 3 Lecture Hours.  
Project design and planning for oceanographers; oceanographic data organization and analysis; synthesis and interpretation of data analysis; technical report writing and presentation.  
Prerequisites: OCNG 281, OCNG 404, OCNG 410, and GEOS 470, or approval of the instructor.

OCNG 469 Python for Geosciences  
Credits 3. 3 Lecture Hours. 1 Lab Hour.  
Core language Python programming, scientific programming analysis methods, analysis of large geophysical data sets, plotting geophysical data, interpolation.  
Prerequisite: Junior or senior classification.

OCNG 481 Seminar  
Credit 1. 1 Lecture Hour.  
Analysis, review and critique of current research themes in oceanography based on reading assignments and seminar presentations. May be taken four times for credit.  
Prerequisite: Junior or senior classification.

OCNG 485 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Special reading assignments, problems and discussion on oceanographic topics of mutual interest to student and instructor.  
Prerequisites: OCNG 251 or OCNG 401 or approval of instructor. An honors section is also available.

OCNG 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of oceanography. May be taken two times for credit.  
Prerequisite: OCNG 251 or OCNG 401 or approval of instructor. An honors section is also available.

OCNG 491 Research  
Credits 0 to 9. 0 to 9 Other Hours.  
Research conducted under the direction of faculty member in oceanography. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor. An honors section is also available.

OCRE Ocean & Coastal Resources (OCRE)  
OCRE 491 Research in Ocean and Coastal Resources  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of faculty member in Ocean and Coastal Resources. May be repeated 2 times for credit. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.  
Prerequisites: Junior or senior classification and approval of instructor.

PERF - Performance Studies (PERF)  
PERF 101 Introduction to Performance Studies  
Credits 3. 3 Lecture Hours.  
Survey of topics in the interdisciplinary field of performance studies, including forms of performance, performance in everyday life and performance in global and intercultural contexts; in-class performance exercises and discussions; major writing component.

PERF 202 Introduction to Performance Technology  
Credits 3. 3 Lecture Hours. 1 Lab Hour.  
Basic hardware, software, and aesthetic concepts of technology-based artistic performance; basic electricity, electronics, troubleshooting, audio and video design software, study of significant works, and participation in a departmental production.

PERF 284 Performance Studies Internship  
Credits 0 to 4. 0 to 4 Lecture Hours.  
Supervised experience program conducted in the area of the student’s interest in performance studies. May be taken three times for credit.  
Prerequisite: PERF 101.

PERF 285 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Directed Studies in specific problems in identified areas of performance studies. May be taken for credit up to 3 hours.  
Prerequisites: Approval of instructor and department head; PERF majors and minors only.

PERF 289 Special Topics in...  
Credits 3. 3 Other Hours.  
Selected topics in performance studies. May be taken for credit seven times.  
Prerequisite: Approval of instructor.

PERF 291 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of faculty member in performance studies. May be taken two times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

PERF 292 Cooperative Education in Performance Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Educational work assignment by a student in the field of his or her career interest and course of study; supervision of the student by the cooperating employer and the instructor; technical report on a related subject area approved by the instructor. May be taken two times for credit.  
Prerequisite: PERF 101.
PERF 301 Performance in World Cultures
Credits 3. 3 Lecture Hours.
Application of the tools of performance studies to explore the enactment of the arts in world cultures and the ways the people of every society express themselves in performance; examination of different genres of performance through music, theatre, verbal art and dress.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: MUSC 301 and THAR 301.

PERF 303 Performance in Practice
Credits 3. 3 Lecture Hours.
Live and mediated performance; techniques and skills for performance; practical experience; discussion and critical analysis of performance; strategies for devising performance.
Prerequisites: Major or minor in PERF; junior or senior classification or approval of instructor.

PERF 310 History of Performance in the Ancient World
Credits 3. 3 Lecture Hours.
Historical approach to performance in the ancient world; primary and secondary evidence for performance practice; application of historical methods in the study of performance.
Prerequisites: Junior or senior classification, or approval of instructor.

PERF 311 History of Performance in the Common Era
Credits 3. 3 Lecture Hours.
Historical approach to performance practices and texts in the Common Era to 1800; transmission of performance styles, techniques and genres across cultures; applications of historical methods in the study of performance.
Prerequisites: Junior or senior classification or approval of instructor.

PERF 318/MUSC 318 Electronic Composition
Credits 3. 3 Lecture Hours.
Project-based study of techniques for creating electronic and mixed-media performance; critical analysis of important electronic and interactive works; interactive media programming techniques for sound and video synthesis, sampling, digital signal processing.
Prerequisites: Junior or senior classification or approval of instructor.
Cross Listing: MUSC 318/PERF 318.

PERF 325/MUSC 325 Dance and World Cultures
Credits 3. 3 Lecture Hours.
Examination of international relationships between dance, culture, identity, gender, youth and politics; relationships between dancing, gender and politics in specific cultures and in globalization; variety of dance practices around the globe.
Prerequisite: Junior or senior classification.
Cross Listing: MUSC 325/PERF 325.

PERF 326 Dance and Identity in the United States
Credits 3. 3 Lecture Hours.
Analysis of dance events as complex sites for social action; examines dances performed by diverse groups of people; considers such issues as identity, community, diversity, gender and representation in the United States.
Prerequisite: Junior or senior classification.

PERF 327 Popular Musics in the African Diaspora
Credits 3. 3 Lecture Hours.
Examination of a range of popular musics from the twentieth century that have emerged in conjunction with the historical global spread of peoples and cultures from the African continent; technical knowledge about music is not required; focus on social and cultural contexts for popular music.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: AFST 327 and MUSC 327.

PERF 402 Intermedia Performance
Credits 3. 3 Lecture Hours.
Study of theory, history, literature and techniques of intermedia composition and design for film, theatre, dance, interactive media, and other forms of performance; examination of the collaborative creative process; projects in interdisciplinary performance.
Prerequisites: Junior or senior classification and MUSC 316, PERF 202, or approval of instructor.
Cross Listing: FILM 402 and MUSC 402.

PERF 450 Seminar in 20th-21st Century Performance
Credits 3. 3 Lecture Hours.
Social, political and aesthetic issues and problems in 20th-21st century performance idioms; study of genres, styles, artistic movements; may include performance. May be taken two times for credit when content varies.
Prerequisites: Junior or senior classification or approval of instructor.

PERF 451 Seminar in Historical Performance
Credits 3. 3 Lecture Hours.
Historical contexts for performance genres, styles or movements prior to the 20th century; texts, performance practices and contexts of performance genres, styles or movements prior to the 20th century; emphasis on historical methods; production participation may be required; may be taken two times for credit if content differs.
Prerequisites: Junior or senior classification or approval of instructor.

PERF 452 Seminar in Global Performance
Credits 3. 3 Lecture Hours.
Intersection of cultures in performances; representations and expressions of culture; focus on culture as the ground for performance; may culminate in a performance. May be taken two times for credit if content differs.
Prerequisites: Junior or senior classification or approval of instructor.

PERF 453 Seminar in Performance Ethnography
Credits 3. 3 Lecture Hours.
Theories and methods of ethnographic research; ethnographic research in the study of performance; ethnography of performance; ethnographic field work may be required.
Prerequisites: Junior or senior classification or approval of instructor.

PERF 454 Seminar Performance in the City
Credits 3. 3 Lecture Hours.
Vernacular and aesthetic performance traditions in a city or cities; politics, culture, economics and geography of city or cities; may include a faculty-led field trip.
Prerequisites: Junior or senior classification or approval of instructor.

PERF 460 Seminar in Performance Theory
Credits 3. 3 Lecture Hours.
In-depth examination of one or more contemporary theories of performance. Emphasis on problems, research, and innovations relevant to performing and analyzing performance; writing intensive.
Prerequisites: Junior or senior classification, or approval of instructor.
PERF 461 Seminar in Folklore
Credits 3. 3 Lecture Hours.
Expressive forms in vernacular culture; folklore genres and traditions of expression; local and regional customs; material culture and narrative; processes of meaning-making; aesthetics in vernacular performance. 
Prerequisites: Junior or senior classification or approval of instructor.

PERF 481 Senior Project
Credits 3. 1 Lecture Hour. 5 Lab Hours.
Capstone senior project on an individually-chosen research topic; presentation of a performance or interdisciplinary project; major writing and oral communication components. 
Prerequisites: Performance studies major; completion of all performance studies coursework or taken concurrently with this course; approval of instructor, advisor and department head.

PERF 483 Performance Practicum
Credits 1 to 3. 1 to 3 Other Hours.
Faculty-supervised performance experience in a public setting as part of a department production or an approved external production. May be taken four times for credit. 
Prerequisite: Junior or senior classification and approval of instructor.

PERF 484 Performance Studies Internship
Credits 0 to 4. 0 to 4 Other Hours.
Supervised experience program conducted in the area of the student’s interest in performance studies. May be taken three times for credit. 
Prerequisites: PERF 101; junior or senior classification.

PERF 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Directed Studies in specific problems in identified areas of performance studies. May be taken for credit up to 3 hours. 
Prerequisites: Approval of instructor and department head; PERF majors and minors only.

PERF 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in performance studies. May be repeated for credit. 
Prerequisite: Approval of instructor.

PERF 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in performance studies. May be taken two times for credit. 
Prerequisites: Junior or senior classification and approval of instructor.

PERF 492 Cooperative Education in Performance Studies
Credits 0 to 3. 0 to 3 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study; supervision of the student by the cooperating employer and the instructor; technical report on a related subject area approved by the instructor. May be taken two times for credit. 
Prerequisites: PERF 101; junior or senior classification.

PETE - Petroleum Engineering (PETE)

PETE 201 Introduction to Petroleum Engineering
Credit 1. 1 Lecture Hour.
Overview and history of the petroleum industry and petroleum engineering; nature of oil and gas reservoirs, exploration and drilling, formation evaluation, well completions and production, surface facilities, reservoir mechanics, improved oil recovery; impact of ethical, societal, environmental considerations; career development resources, including professional society. 
Prerequisite: Approval of department head.

PETE 225 Introduction to Drilling Systems
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to petroleum drilling systems, including fundamental petroleum engineering concepts, quantities and unit systems, drilling rig components, drilling fluids, pressure loss calculations, casing, well cementing, and directional drilling. 
Prerequisites: Grade of C or better in ENGR 112, MATH 152 and PHYS 218.

PETE 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems in various areas of petroleum engineering assigned to individual students or to groups. 
Prerequisites: Approval of department head.

PETE 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of petroleum engineering. May be repeated for credit. 
Prerequisite: Approval of instructor.

PETE 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member in petroleum engineering. May be taken two times for credit. Registration in multiple sections of this course is possible within a given semester. 
Prerequisites: Freshman or sophomore classification and approval of instructor.

PETE 300 Summer Practice
Credits 0.
Required. No Credit. Industry practice to familiarize the petroleum engineering student with practices and equipment of the petroleum industry. Approval of advisor required.

PETE 301 Petroleum Engineering Numerical Methods
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Use of numerical methods in a variety of petroleum engineering problems; numerical differentiation and integration; root finding; numerical solution of differential equations; curve fitting and interpolation; computer applications; introduction to the principles of numerical simulation methods. 
Prerequisites: MATH 308, junior or senior classification, petroleum engineering majors only; or approval of instructor.

PETE 310 Reservoir Fluids
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Thermodynamic behavior of naturally occurring hydrocarbon mixtures; evaluation and correlation of physical properties of petroleum reservoir fluids including laboratory and empirical methods. 
Prerequisites: Grade of C or better in CHEM 107 and CHEM 117; MATH 251, MEEN 315, PETE 311. 
Corequisite: MATH 308.
PETE 311 Reservoir Petrophysics  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Systematic theoretical and laboratory study of physical properties of petroleum reservoir rocks; lithology, porosity, elastic properties, strength, acoustic properties, electrical properties, relative and effective permeability, fluid saturations, capillary characteristics and rock-fluid interactions such as adsorption and absorption.  
Prerequisites: MATH 251; PHYS 208 with a grade of C or better.  
Corequisite: GEOL 104.  

PETE 314 Transport Processes in Petroleum Production  
Credits 3. 3 Lecture Hours.  
Basics and applications of fluid mechanics (statics; mass, energy, momentum balances; laminar and turbulent flow, Reynolds number, Moody diagram; non-Newtonian fluid flow; multi-phase flow; flow in porous media, non-Darcy flow); heat transfer (heat conduction, convection, heat exchangers); emphasis on analogies and similarities within mass, energy and momentum transport.  
Prerequisites: MEEN 315, junior or senior classification, petroleum engineering majors only; or approval of instructor.  

PETE 321 Formation Evaluation  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Well-log interpretation for formation evaluation of hydrocarbon-bearing reservoirs; basic rock physics principles; theory of tool operation; analysis of open hole logs and core measurements to estimate hydrocarbon reserves and petrophysical properties of the formation such as porosity, net pay thickness, water/hydrocarbon saturation, permeability and saturation-dependent capillary pressure; formation evaluation of clay-free and shaly-sand formations as well as basic introduction to formation evaluation of organic-shale formations.  
Prerequisites: PETE 301, PETE 310, PETE 311; GEOL 404, junior or senior classification, petroleum engineering majors only; or approval of instructor.  

PETE 322 Geostatistics  
Credits 3. 3 Lecture Hours.  
Introduction to geostatistics; basic concepts in probability and univariate statistics; bivariate statistics and spatial relationship; covariance and correlation; second order stationarity; variogram estimation and modeling; spatial estimation and reservoir modeling; simple and ordinary kriging; uncertainty analysis; estimation versus conditional simulation; sequential Gaussian simulation.  
Prerequisites: Senior classification, petroleum engineering majors only; or approval of instructor.  

PETE 323 Fundamentals of Reservoir Engineering  
Credits 3. 3 Lecture Hours.  
Determination of reserves; material balance methods; aquifer models; fractional flow and frontal advance; displacement, pattern and vertical sweep efficiencies in waterfloods; enhanced oil recovery processes; design of optimal recovery processes; introduction and performance analysis of unconventional reservoirs.  
Prerequisites: PETE 301, PETE 310, PETE 311; GEOL 404, junior or senior classification, petroleum engineering majors only; or approval of instructor.  

PETE 324 Well Testing  
Credits 3. 3 Lecture Hours.  
Analysis of well performance under varied reservoir conditions including evaluation of unsteady, pseudo-steady and steady state flow; well testing methods used to determine well and reservoir parameters; applications to conventional and unconventional wells producing gas and/or liquids; fundamentals of preparing and operating well test equipment to monitor, measure and gather samples for evaluating well performance.  
Prerequisites: PETE 301, PETE 310, PETE 311; GEOL 404, junior or senior classification, petroleum engineering majors only; or approval of instructor.  

PETE 325 Petroleum Production Systems  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Petroleum operation and oil field equipment including onshore and offshore production systems; wellbore inflow and outflow analysis, backpressure analysis; downhole completion and sand control equipment; artificial lift equipment and design; stimulation, workover/completion nomenclature, flow assurance; produced fluids, fluid separation and metering, safety systems, pressure boosting and monitoring.  
Prerequisites: PETE 301, PETE 310, PETE 314, junior or senior classification, petroleum engineering majors only; or approval of instructor.  

PETE 335 Technical Presentations I  
Credit 1. 1 Lecture Hour.  
Preparation of a written technical paper proposal on a subject related to petroleum technology and an oral presentation of the proposal in a formal technical conference format.  
Prerequisites: COMM 203, COMM 205 or ENGL 210; junior or senior classification.  

PETE 337 Junior Student Paper Contest  
Credits 0.  
No Credit. Presentation of a technical proposal on a subject related to petroleum technology judged by petroleum professionals at the junior level departmental student paper contest. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisite: PETE 335.  

PETE 339 Petroleum Project Evaluation  
Credits 3. 3 Lecture Hours.  
Economic analysis and investment decision methods in petroleum and mineral extraction industries; depletion, petroleum taxation regulations, and projects of the type found in the industry; mineral project evaluation case studies.  
Corequisites: PETE 301, PETE 310.  

PETE 355 Drilling Engineering  
Credits 3. 3 Lecture Hours.  
Design and evaluation of well drilling systems; identification and solution of drilling problems; wellbore hydraulics, well control, casing design; well cementing directional drilling, offshore drilling.  
Prerequisites: CVEN 305, PETE 225, PETE 314;  
Corequisites: PETE 321, PETE 325.  

PETE 401 Reservoir Simulation  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Solution of production and reservoir engineering problems using state-of-the-art commercial reservoir simulation software, using data commonly available in industry; emphasis on reservoir description, reservoir model design and calibration, production forecasting and optimization, economic analysis and decision making under uncertainty.  
Prerequisites: PETE 310, PETE 321, PETE 323, PETE 324, PETE 353.
PETE 402 Integrated Asset Development  
Credits 3. 3 Lecture Hours.  
Capstone design encompassing previously acquired skills; project teams formed to solve practical petroleum engineering problems using current tools; technical content of the projects may include any combination of drilling and completion, formation evaluation, inflow/outflow design and analysis, and application of reservoir engineering principles.  
Prerequisites: PETE 355, PETE 401, PETE 404, PETE 410.

PETE 404 Integrated Reservoir Modeling  
Credits 3. 3 Lecture Hours.  
Geophysical, geological, petrophysical and engineering data with geostatistical methods to create reservoir descriptions for dynamic reservoir modeling (simulation); geostatistical concepts such as variogram modeling, kriging and sequential Gaussian simulation; combines several techniques to quantify uncertainty in a realistic dynamic reservoir simulation.  
Corequisite: PETE 401.

PETE 406 High Performance Drilling Design and Operational Practices  
Credits 3. 3 Lecture Hours.  
Preparation in achieving differentiating drilling performance in the most complex wells; includes training in the underlying physics of each type of performance limiter and real time and engineering practices to address the limitation; performance management workflows and change models required to effectively change the way organizations conduct work essential in achieving higher performance.  
Prerequisite: PETE 355.

PETE 408 Probabilistic Reserves Evaluation  
Credits 3. 3 Lecture Hours.  
Oil and gas reserves definitions and reporting regulations; probabilistic reserves estimation methods; unconventional resources characterization; reserves valuation techniques.  
Prerequisite: PETE 353 or approval of instructor.

PETE 409 Enhanced Oil Recovery  
Credits 3. 3 Lecture Hours.  
Fundamentals and theory of enhanced oil recovery; polymer flooding, surfactant flooding, miscible gas flooding and steam flooding; application of fractional flow theory; strategies and displacement performance calculations.  
Prerequisites: PETE 310 or approval of instructor.

PETE 410 Production Engineering  
Credits 3. 3 Lecture Hours.  
Fundamental production engineering design, evaluation and optimization for oil and gas producing well; well deliverability; formation damage and skin analysis; well completion selection; technologies that improve oil and gas well performance including artificial lift and well stimulation.  
Prerequisites: PETE 321, PETE 323, PETE 324, PETE 325.

PETE 416 Solving Common Production Engineering Problems  
Credits 3. 3 Lecture Hours.  
Application of petroleum engineering tools, methods and techniques to solve real problems that petroleum engineers encounter in producing individual wells; focus primarily on problems associated with single-phase gas wells and uses Microsoft Excel to solve many of these problems.  
Prerequisite: PETE 410.

PETE 418 Deterministic Reserves Evaluation  
Credits 3. 3 Lecture Hours.  
Oil and gas reserves definitions and reporting regulations; deterministic estimation methods; unconventional resources characterization; reserves valuation techniques.  
Prerequisite: PETE 353 or approval of instructor.

PETE 435 Technical Presentations II  
Credit 1. 1 Lecture Hour.  
Preparation of a written technical paper on a subject related to petroleum technology and an oral presentation of the paper in a formal technical conference format.  
Prerequisites: PETE 337.

PETE 437 Senior Student Paper Contest  
Credits 0.  
No credit. Presentation of a technical petroleum engineering topic judged by petroleum professionals at the senior level departmental student paper contest. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisite: PETE 435 or concurrent enrollment.

PETE 458 Energy and Sustainability  
Credits 3. 3 Lecture Hours.  
Energy resources and use with emphasis on long-term sustainability; considers fossil, nuclear and alternative energy sources, electricity and transportation, energy conversions, energy efficiency, energy security, energy policy and environmental impact.

PETE 485 Directed Studies  
Credits 1 to 5. 1 to 5 Other Hours.  
Special problems in various phases of petroleum engineering assigned to individual students or to groups.  
Prerequisites: Junior or senior classification and approval of department head.

PETE 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified field of petroleum engineering. Approval of instructor. May be repeated for credit.

PETE 491 Research  
Credits 1 to 4. 1 to 4 Other Hours.  
Research conducted under the direction of a faculty member in petroleum engineering. May be taken two times for credit. Registration in multiple sections of this course is possible within a given semester.  
Prerequisites: Junior or senior classification and approval of instructor.

PHIL - Philosophy (PHIL)

PHIL 111 Contemporary Moral Issues  
Credits 3. 3 Lecture Hours.  
(PHIL 2306) Contemporary Moral Issues. Representative ethical positions and their application to contemporary social problems.

PHIL 205 Technology and Human Values  
Credits 3. 3 Lecture Hours.  
Interaction of personal and societal values with technology and man's self-image, the future and value change.

PHIL 208 Philosophy of Education  
Credits 3. 3 Lecture Hours.  
Basic social ideas and concepts of human nature in Western civilization; their implications for theories of education.
PHIL 240 Introduction to Logic
Credits 3. 3 Lecture Hours.
(Phil 2303) Introduction to Logic. Introduction to formal methods of deductive and inductive logic including, but not limited to, truth-tables, formal deduction and probability theory.

PHIL 251 Introduction to Philosophy
Credits 3. 3 Lecture Hours.
(Phil 1301) Introduction to Philosophy. Perennial problems of philosophy such as the existence of God, the mind/body relationship, the limits of knowledge, the foundations of moral judgment, man and the state.

PHIL 252/AFST 252 Introduction to Hip-Hop Philosophy
Credits 3. 3 Lecture Hours.
Introduction to philosophy by way of the major themes and subjects of Hip-Hop; critical advocacy of various philosophical ideals.
Cross Listing: AFST 252/PHIL 252.

PHIL 283 Latin American Philosophy
Credits 3. 3 Lecture Hours.
Major philosophers in the history of Latin American philosophy, such as Unamuno, Ortega y Gasset, Vasconcelos, Caso and Gutiérrez.

PHIL 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed studies in specific problem areas of philosophy.
Prerequisite: Approval of department head.

PHIL 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of philosophy. May be repeated for credit.
Prerequisite: Approval of instructor.

PHIL 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in the department of philosophy and humanities. May be taken two times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

PHIL 305 Philosophy of the Natural Sciences
Credits 3. 3 Lecture Hours.
Critical analysis of scientific methods and achievements; the nature and types of explanation, discovery and confirmation, models and theories.
Prerequisite: 3 hours of philosophy other than PHIL 240.

PHIL 307 Philosophy of the Social Sciences
Credits 3. 3 Lecture Hours.
Nature and objectivity of the social sciences, their paradigms and patterns of explanation.
Prerequisite: 3 hours of philosophy other than PHIL 240.

PHIL 314 Environmental Ethics
Credits 3. 3 Lecture Hours.
Moral basis of duties to preserve or protect plants, animals and environmental systems; foundations of environmental law and policy; the idea of nature in philosophy; critique of social and economic analyses of environmental values.
Prerequisite: Sophomore classification or approval of instructor.

PHIL 315 Military Ethics
Credits 3. 3 Lecture Hours.
Major ethical issues in modern military practice: ethics of leadership, just war theory, killing of the innocent and the moral status of the rules of war.

PHIL 320 Philosophy of Mind
Credits 3. 3 Lecture Hours.
Relation of mind to body, nature of thought and knowing, the free will problem, death and immortality.
Prerequisite: 3 hours of philosophy other than PHIL 240.

PHIL 330 Philosophy of Art
Credits 3. 3 Lecture Hours.
Theories of artistic creation and aesthetic response as exemplified in art forms such as painting, music, poetry, architecture, dance, theater, sculpture and motion pictures.

PHIL 331/RELS 331 Philosophy of Religion
Credits 3. 3 Lecture Hours.
Philosophical problems of Western religion such as the existence of God, the problem of evil, types of theism, rational, empirical and mystical approaches to God.
Cross Listing: RELS 331/PHIL 331.

PHIL 332 Social and Political Philosophy
Credits 3. 3 Lecture Hours.
Metaphysical commitments and political theory, the nature and proper ends of the state, freedom, equality, authority, and justice, considering such writers as Plato, Aristotle, Machiavelli, Locke, Rousseau, Marx, Dewey.
Prerequisite: 3 hours of philosophy other than PHIL 240.

PHIL 334 Philosophy of Law
Credits 3. 3 Lecture Hours.
Traditional legal issues such as definitions of law, relationship between law and morality, and punishment considered from a legal perspective.
Prerequisite: Junior or senior classification.

PHIL 341 Symbolic Logic
Credits 3. 3 Lecture Hours.
Elementary symbolic logic beginning with propositional calculus and first order predicate logic, and their applications.
Prerequisite: PHIL 240.

PHIL 342 Symbolic Logic II
Credits 3. 3 Lecture Hours.
Advanced topics in logic such as the theory of identity, higher order logics, logic of sets, elements of modal logic.
Prerequisite: PHIL 240 or PHIL 341, or approval of instructor.

PHIL 351 Theory of Knowledge
Credits 3. 3 Lecture Hours.
Major topics in epistemology such as the problem of induction, perception theory, memory and the problem of other minds.
Prerequisites: 3 hours of philosophy.

PHIL 352/AFST 352 Africana Philosophy
Credits 3. 3 Lecture Hours.
Presentation of the seminal ideas of several influential Africana thinkers; recovery of the neglected traditions in which these thinkers locate themselves. May be taken three times for credit.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: AFST 352/PHIL 352.

PHIL 353/AFST 353 Radical Black Philosophies of Race and Racism
Credits 3. 3 Lecture Hours.
Critical evaluation of white supremacy, colonialism, and the modern construction of race; examination of the historical background for contemporary theories of race.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: AFST 353/PHIL 353.
PHIL 361 Metaphysics
Credits 3. 3 Lecture Hours.
Topics concerning the fundamental nature of reality such as what exists, the mental and the physical, universals and individuals, space and time, God.
Prerequisites: PHIL 240 and 3 hours of philosophy.

PHIL 371 Philosophy of Literature
Credits 3. 3 Lecture Hours.
Philosophical analysis of the major recurrent themes in world literature including fate, the meaning of tragedy, death, odyssey, good and evil, time and eternity, hope and salvation; works selected from a variety of cultures and historical periods.

PHIL 375 Philosophy of the Visual Media
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Aesthetic, ethical and epistemological issues of photography, cinema and video.

PHIL 376/FILM 376 Philosophy, Film and Evil
Credits 3. 3 Lecture Hours.
Application of philosophical methods and analyses to the medium of film; survey of various depictions and treatments of evil within the genre of science fiction; investigation of depictions and treatments of evil arising from consideration of human encounters with alien others.
Prerequisite: Junior or senior classification.
Cross Listing: FILM 376/PHIL 376.

PHIL 381 Ethical Theory
Credits 3. 3 Lecture Hours.
Values and conduct such as moral relativism, self-interest, utilitarianism, rules, nature of valuation, ethical language and argumentation.
Prerequisite: 3 hours of Philosophy other than PHIL 240.

PHIL 409/WGST 409 Studies in Gender and Philosophy
Credits 3. 3 Lecture Hours.
Analysis, from a gender-studies perspective, of a single figure or concept in the history of philosophy. May be repeated 1 time for credit with a different focus.
Prerequisites: 3 hours in philosophy and women’s and gender studies; junior or senior classification.
Cross Listing: WGST 409/PHIL 409.

PHIL 410 Classical Philosophy
Credits 3. 3 Lecture Hours.
Major philosophers from 600 B.C. to the end of the third century A.D. including the Pre-Socratics, Socrates, Plato, Aristotle, Hellenistic and Roman philosophy and the Neo-Platonists.

PHIL 411 Medieval Philosophy
Credits 3. 3 Lecture Hours.
Major philosophers from the early Christian centuries through the 14th century, emphasizing such writers as Augustine, Aquinas, Duns Scotus and William of Ockham.

PHIL 412 Seventeenth-Century Philosophy
Credits 3. 3 Lecture Hours.
Significant seventeenth-century texts in metaphysics, epistemology, moral psychology, and political philosophy; authors such as Descartes, Hobbes, Spinoza, Leibniz, and Locke.
Prerequisite: Junior or senior classification or approval of instructor.

PHIL 413 Eighteenth-Century Philosophy
Credits 3. 3 Lecture Hours.
Significant eighteenth-century texts from philosophers such as Berkeley, Rousseau, Hume, and Kant.

PHIL 414 Nineteenth Century Philosophy
Credits 3. 3 Lecture Hours.
Contributions of such philosophers as Hegel, Marx, Kierkegaard, Nietzsche, Husserl, Mill and Bradley.
Prerequisite: 3 hours of philosophy.

PHIL 415 American Philosophy
Credits 3. 3 Lecture Hours.
The thought of philosophers such as Peirce, James, Royce, Santayana, Mead, Dewey and Whitehead.
Prerequisite: 3 hours of philosophy other than PHIL 240.

PHIL 416 Recent British and American Philosophy
Credits 3. 3 Lecture Hours.
Major philosophers in contemporary Anglo-American thought such as Moore, Russell, Wittgenstein, Ayer, Quine, Austin and Ryle.
Prerequisites: PHIL 240.

PHIL 417 Phenomenology
Credits 3. 3 Lecture Hours.
Phenomenology from its nineteenth-century origins to the present; authors such as Brentano, Husserl, Scheler, Heidegger, Merleau-Ponty, Levinas, Henry, Marion.
Prerequisites: Junior or senior classification.

PHIL 418 Existentialism
Credits 3. 3 Lecture Hours.
Existentialism from its nineteenth-century origins to the present; philosophers such as Kierkegaard, Nietzsche, Buber, Rosenzweig, Sartre, de Beauvoir, and Camus.
Prerequisite: PHIL 412 or 413; junior or senior classification or approval of instructor.

PHIL 419 Current Continental Philosophy
Credits 3. 3 Lecture Hours.
Major thinkers concerned with "postmodern" topics in hermeneutics, poststructuralism, critical theory, deconstructionism, contemporary Marxist strategies, semiotics and feminist theory.
Prerequisite: Junior classification or approval of instructor.

PHIL 424 Philosophy of Language
Credits 3. 3 Lecture Hours.
The nature of language; the various uses of language and their philosophical import; the nature of meaning, truth, reference and issues surrounding formal representations of natural languages.
Prerequisite: PHIL 240 and 3 additional hours of philosophy; junior or senior classification or approval of instructor.

PHIL 464/RELS 464 Modern Jewish Thought and Philosophy
Credits 3. 3 Lecture Hours.
An overview of modern Jewish thought and philosophy spanning Jewish European thinkers from the 18th century to the 20th century.
Prerequisite: Junior or senior classification.
Cross Listing: RELS 464/PHIL 464.

PHIL 480 Medical Ethics
Credits 3. 3 Lecture Hours.
Critical analysis of major ethical issues in medicine including truth telling, confidentiality, paternalism, genetics, abortion, infanticide, euthanasia and social justice in health care.
PHLT 482/ENGR 482 Ethics and Engineering
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Development of techniques of moral analysis and their application to ethical problems encountered by engineers, such as professional employee rights and whistle blowing, environmental issues; ethical aspects of safety, risk and liability; conflicts of interest; emphasis on developing the capacity for independent ethical analysis of real and hypothetical cases.
Prerequisite: Junior classification.
Cross Listing: ENGR 482/PHIL 482.

PHLT 484 Professional Internship
Credits 0 to 6. 0 to 6 Other Hours.
Practical experience in an institutional or organizational setting appropriate to analysis and understanding of issues in some area of applied philosophy. May be taken five times for credit.
Prerequisite: Approval of instructor and department head.

PHIL 485 Directed Studies
Credits 0 to 6. 0 to 6 Other Hours.
Directed studies in specific problem areas of philosophy.
Prerequisite: Approval of department head.

PHLT 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of philosophy. May be repeated for credit.

PHIL 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in the department of philosophy and humanities. May be taken two times for credit.
Prerequisite: Junior or senior classification and approval of dean of college.

PHIL 497 Independent Honors Studies
Credits 1 to 3. 1 to 3 Other Hours.
Directed independent studies in specific philosophical problems.
Prerequisite: Junior or senior classification either as Honors students or with overall GPR of 3.25; letter of approval from head of student’s major department.

PHLT - Public Health (PHLT)

PHLT 289 Special Topics In...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of public health. May be taken three times for credit.
Prerequisite: PHLT major or approval of instructor.

PHLT 301 Orientation to Public Health
Credit 1. 1 Lecture Hour.
Familiarization with public health including aspects such as different disciplines within the profession; local, national and international agencies that have interest in public health and public health code of ethics.
Prerequisite: Public health major; junior or senior classification; approval of instructor.

PHLT 302 Foundations of Public Health
Credits 3. 3 Lecture Hours.
History, philosophy, development and careers of public health; core values, ethics, concepts, functions and essential services of public health; population health and health improvement.
Prerequisites: Public health major or minor, junior or senior classification, or approval of instructor.

PHLT 303 Social Context of Population Health
Credits 3. 3 Lecture Hours.
Exploration of social determinants of population health and the socio-cultural roots of health improvement; socio-economic, behavioral and other factors that impact human health and contribute to health improvement and health disparities.
Prerequisites: Public health major or minor, junior or senior classification, or approval of instructor.

PHLT 304 Biological Basis of Public Health
Credits 3. 3 Lecture Hours.
Biological mechanisms in individuals and populations affecting human health and disease; adverse health events including diseases, exposure to pathogens and toxins, and nutritional deficiencies.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 305 Epidemiology in Public Health
Credits 3. 3 Lecture Hours.
Principles of epidemiology, a systematic approach to collecting and evaluating information on distributions of health outcomes in populations; history of epidemiology, descriptive epidemiology, epidemiologic methods, association and causation, evidence-based public health and applications.
Prerequisites: Public health major or minor, junior or senior classification, or approval of instructor.

PHLT 306 Border Health
Credits 3. 3 Lecture Hours.
United States-Mexico border public health system; includes issues important to public health at the border; addresses health challenges.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 307 Public Health in the Global Context
Credits 3. 3 Lecture Hours.
Frameworks for understanding population health on a global scale; physical, social, cultural, geographic, political and economic interactions and interdependencies that influence global population health status.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 308 Comparative Global Health Systems
Credits 3. 3 Lecture Hours.
Public health issues from population health and comparative perspectives at the global level; exploration of different public health systems in developing and developed countries.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 309 Population Health Promotion
Credits 3. 3 Lecture Hours.
Major issues in population health promotion, including applying the concept of social determinants of health: the socio-economic, behavioral, and other factors that impact human health to address population health issues.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.
PHLT 310 Public Health Writing
Credit 1. 1 Lecture Hour.
Strategies to become more familiar with types of writing required as public health students or public health professionals; strengthens and increases general writing skills; establishes a foundation for continued development in writing. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Public health major; junior or senior classification; approval of instructor.

PHLT 311 Narrative Approach to Public Health
Credit 1. 1 Lecture Hour.
Familiarization with the writing style required for public health; instruction in writing styles and narrative techniques to increase and strengthen writing abilities in public health disciplines such as environmental and occupational health, health promotion and community health sciences, health policy and management, epidemiology and biostatistics. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 313 Health Care and Public Health System
Credits 3. 3 Lecture Hours.
Two distinct systems – health care system: an individual and medical services model and the public health system: population level disease prevention and health education.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 314 Public Health Data Management and Assessment I
Credits 2. 2 Lecture Hours.
Familiarization with using the CDC software Epi-Info for managing, analyzing and assessing population health data; focus on using Epi-Info to produce descriptive data reports including tables and graphs.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 315 Public Health Data Management and Assessment II
Credits 2. 2 Lecture Hours.
Continuation of PHLT 314; familiarization with using the CDC software Epi-Info for managing, analyzing and assessing population health data; focus on using Epi-Info to generate inferential statistics such as confidence intervals and p-values.
Prerequisites: Public health major; PHLT 314; or approval of instructor.

PHLT 330 The Environment and Public Health
Credits 3. 3 Lecture Hours.
Environmental exposures and population health; public health core knowledge; includes methods for defining environmental contamination; identifying contaminants, pathogens and toxins; assessing risks and causality; determining health impact; methods to decrease exposures.
Prerequisites: Public health major or minor, junior or senior classification, or approval of instructor.

PHLT 331 Occupational Safety and Health I
Credits 3. 3 Lecture Hours.
Regulations and topics of relevance to occupational health professionals; includes legislation and regulations, workers' compensation, accident investigation, industrial hygiene, ergonomics and fire prevention with an emphasis on the health professionals' role.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 332 Occupational Safety and Health II
Credits 3. 3 Lecture Hours.
Occupational safety and health topics including behavior-based safety, workplace violence, preparedness, hazardous materials, construction, transportation, required written programs and professional resources.
Prerequisites: Public health major; PHLT 331; or approval of instructor.

PHLT 333 Accident Investigation
Credits 3. 3 Lecture Hours.
Principles of accident investigation and how accidents happen in the workplace; integrates procedural, systematic, corrective and formative applications for the occupational health professional.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 334 Fire Safety and Workplace Hazards
Credits 3. 3 Lecture Hours.
Principles of fire safety and other workplace hazards such as electrical hazards, chemical hazards, respiratory hazards, falls, confined spaces, bloodborne pathogens, hearing loss, ergonomics and machine hazards.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 335 Hazardous Materials
Credits 3. 3 Lecture Hours.
Principles of managing materials in the workplace: role of the health and safety professional in hazardous material management and hazard communication.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 340 Public Health Communication
Credits 3. 3 Lecture Hours.
Exploration of different communication approaches for addressing public health challenges; basic concepts of public health-specific communication, including risk communication, the use of mass media and evaluation of public health communication programs.
Prerequisites: PHLT 310; public health major; or approval of instructor.

PHLT 410 Public Health Communication
Credits 3. 3 Lecture Hours.
Exploration of successful project management and administration in public health settings; includes project development, budgeting and implementation.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 411 Project Management in Public Health
Credits 3. 3 Lecture Hours.
Principles of managing materials in the workplace; role of the health and safety professional in hazardous material management and hazard communication.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 412 Health Advocacy and Policy
Credits 3. 3 Lecture Hours.
Concepts of legal, ethical, economic and regulatory dimensions of public health policy; the roles, influences and responsibilities of the different agencies and branches of government; advocacy for the public’s health at all levels of society.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 413 Public Health Informatics
Credits 3. 3 Lecture Hours.
Broad range of knowledge and skills encompassed by PHI; bridging public health data/information needs, information technology and stakeholders; creating user requirements to guide system design; evidence-based public health; electronic health records.
Prerequisite: PHLT 302 or approval of instructor.
PHLT 414 Applications of Epidemiology in Public Health
Credits 3. 3 Lecture Hours.
Application of the concept of distribution, determinants and measurement of health and disease outcomes in populations in real life situations through lectures, case studies and presentations.
Prerequisites: Public health major; PHLT 305; or approval of instructor.

PHLT 415 Emergency Management in Public Health
Credits 3. 3 Lecture Hours.
Principles and practices of emergency management at the local, state, national and international levels; explores stages of emergency management such as preparedness, response and recovery; includes population health and the basic processes, approaches and interventions; emergency management systems in the United States; actors in emergency management.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 416 Public Health Leadership and Ethics
Credits 3. 3 Lecture Hours.
Overview of major leadership and ethical theories, current leadership and ethical issues and their impact on public health practice.
Prerequisite: Public health major; junior or senior classification; or approval of instructor.

PHLT 432 Human Factors and Ergonomic Health and Safety
Credits 3. 3 Lecture Hours.
Principles of ergonomics including principles of anatomy, physiology, instrument design, and work environments; emphasis on ergonomic design, implementing ergonomic programs.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 433 Industrial Inspections and Audit Techniques
Credits 3. 3 Lecture Hours.
Principles of conducting industrial audits for fire, safety and security; emphasis on the role of the health and safety professional, assessing safety programs and meeting regulatory requirements.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 434 Project Cost Benefit and Economics
Credits 3. 3 Lecture Hours.
Estimation and management of project costs; emphasis on improving accuracy of cost projection, making better modifications to cost on work in-progress.
Prerequisites: Public health major; junior or senior classification; or approval of instructor.

PHLT 441 Strategies for Population Health Improvement
Credits 3. 3 Lecture Hours.
The three core functions of public health and strategies for improving population health; case studies exploring multiple types of interventions; involves class discussion, break-out groups and group assignments.
Prerequisite: PHLT 302; PHLT 411 or concurrent enrollment; public health major; junior or senior classification; or approval of instructor.

PHLT 445 Applications of Public Health
Credits 3. 3 Lecture Hours.
Combines knowledge and skills related to public health experience and coursework to address public health issues; process of developing, implementing and evaluating public health interventions; role assignment and responsibilities in group assignments and presentations.
Prerequisite: PHLT 441 or concurrent enrollment; public health major; junior or senior classification; or approval of instructor.

PHLT 470 Global Public Health Systems and Practice Experiences
Credits 3. 3 Other Hours.
Study abroad experiences led by School of Public Health faculty in select countries; lectures prior to departing and lectures and classes in country; engage in public health practice and research activities in country; visit public health agencies and programs in country.
Prerequisites: Junior or senior classification; approval of instructor.

PHLT 484 Public Health Studies Field Experience
Credits 3. 3 Other Hours.
On the job training in the area of public health studies industry; development of objectives and goals; evaluation by supervisor required.
Prerequisites: Approval of instructor; junior or senior classification; public health major with a minimum overall 3.0 TAMU GPA.

PHLT 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed study of selected problems in the area of public health studies. May be taken four times for credit.
Prerequisite: Approval of instructor.

PHLT major; PHLT 485; junior or senior classification and approval of instructor.

PHLT 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in public health studies. May be taken two times for credit.
Prerequisites: PHLT 485; junior or senior classification or approval of instructor.

PHLT 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in public health studies. May be taken two times for credit.
Prerequisites: PHLT 485; junior or senior classification or approval of instructor.

PHYS - Physics (PHYS)

PHYS 101 Freshman Physics Orientation
Credit 1. 1 Lecture Hour.
Critical thinking skills and problem solving in physics: time management and teaming skills. For physics majors. Registration by non-majors requires approval of instructor.
Prerequisite: PHYS 218 or registration therein; MATH 171 or registration therein; or approval of instructor.

PHYS 102 Freshman Physics Orientation II
Credit 1. 1 Lecture Hour.
Critical thinking skills and problem solving in physics: time management and teaming skills. For physics majors. Registration by non-majors requires approval of instructor.
Prerequisites: PHYS 101, PHYS 208 or registration therein; MATH 172 or registration therein; or approval of instructor.

PHYS 109/ASTR 109 Big Bang and Black Holes
Credits 3. 3 Lecture Hours.
Designed to give an intuitive understanding of the Big Bang and Black Holes, without mathematics, and de-mystify them for the non-scientist.
PHYS 119/ASTR 119 Big Bang and Black Holes: Laboratory Methods
Credit 1. 2 Lab Hours.
Hands-on understanding of the concepts surrounding the Big Bang and Black Holes; emphasis on the evidence-based decision making process, methods and presentation; for non-scientists. Companion course for ASTR 109/PHYS 109/PHYS 109/ASTR 109.
Prerequisite: ASTR/PHYS 109/ASTR 109 or registration therein.
Cross Listing: ASTR 119/PHYS 119.

PHYS 123 Physics for Future Presidents
Credits 3. 3 Lecture Hours.
Physics needed to be an effective policy maker or world leader but appropriate for any citizen, since all citizens need to understand the world in which they live and work; fundamental principles of physics made comprehensible and usable by those not in science- or math-related fields.
Prerequisite: Basic math skills.

PHYS 201 College Physics
Credits 4. 3 Lecture Hours. 3 Lab Hours.

PHYS 202 College Physics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(PHYS 1302 and 1102, 1402) College Physics. Continuation of PHYS 201. Fundamentals of classical electricity and light; introduction to contemporary physics.
Prerequisite: PHYS 201.

PHYS 205 Concepts of Physics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
General survey physics course for K-8 preservice teachers integrating physics content and laboratory activities relevant to physics-related subject matter included in the current Texas and national standards for elementary school science; includes aspects of mechanics, waves, electricity, magnetism and modern physics.
Prerequisite: Major in interdisciplinary studies or interdisciplinary technology or approval of instructor.

PHYS 208 Electricity and Optics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
(PHYS 2326 and PHYS 2126, PHYS 2426) Electricity and Optics. Continuation of PHYS 218. Electricity, magnetism, and introduction to optics. Primarily for students in science and engineering.
Prerequisites: PHYS 218; MATH 152 or MATH 172 or registration therein.

PHYS 218 Mechanics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Prerequisite: MATH 151 or MATH 171 or registration therein.

PHYS 221 Optics and Thermal Physics
Credits 3. 3 Lecture Hours.
Wave motion and sound, geometrical and physical optics, kinetic theory of gases, laws of thermodynamics.
Prerequisites: PHYS 208; MATH 152 or MATH 172; registration in MATH 221, MATH 308.

PHYS 222 Modern Physics for Engineers
Credits 3. 3 Lecture Hours.
Atomic, quantum, relativity and solid state physics.
Prerequisites: PHYS 208 or PHYS 219; MATH 308 or registration therein.

PHYS 225 Electronic Circuits and Applications
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Linear circuit theory and applications of solidstate diodes, bipolar and field-effect transistors, operational amplifiers and digital systems.
Prerequisites: PHYS 208; MATH 308.

PHYS 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum; intended for use as lower-level credit.
Prerequisite: Approval of department head.

PHYS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 6 Lab Hours.
Selected topics in an identified area of physics. May be repeated for credit.
Prerequisite: Approval of instructor.

PHYS 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in physics. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

PHYS 302 Advanced Mechanics I
Credits 3. 3 Lecture Hours.
Classical mechanics of particles and rigid bodies, both by direct application of Newton's equations and by Lagrangian methods; applications to gravity and other central forces, coupled oscillators, non-inertial reference frames, and the statics and dynamics of fluids with and without viscosity; introduction to statics of structures.
Prerequisites: MATH 221 or MATH 251 or MATH 253; MATH 308; PHYS 208, PHYS 218, PHYS 222, and PHYS 331; concurrent enrollment in PHYS 332; for students with other backgrounds, approval of instructor.

PHYS 303 Advanced Mechanics II
Credits 3. 3 Lecture Hours.
Classical mechanics of particles and rigid bodies with an emphasis on Lagrangian and Hamiltonian methods; applications to chaos, scattering, coupled oscillations, and continua, including sound in fluids; mechanical implications of special relativity, introduction to drag and turbulence in fluids; introduction to elasticity in solids; Euler buckling instability.
Prerequisites: PHYS 302 and PHYS 332.

PHYS 304 Advanced Electricity and Magnetism I
Credits 3. 3 Lecture Hours.
Electrostatics; dielectrics; electrical current and circuits; magnetic fields and materials; induction; Maxwell's equations.
Prerequisites: PHYS 221; PHYS 331; concurrent enrollment in PHYS 332; junior or senior classification.

PHYS 305 Advanced Electricity and Magnetism II
Credits 3. 3 Lecture Hours.
Radiation and optics. Electromagnetic waves; radiation; reflection and refraction; interference; diffraction; special relativity applied to electrodynamics.
Prerequisite: PHYS 304.

PHYS 309 Modern Physics
Credits 3. 3 Lecture Hours.
Special relativity; concepts of waves and particles; introductory quantum mechanics.
Prerequisites: PHYS 221; MATH 221; MATH 308.
PHYS 327 Experimental Physics I
Credits 2. 1 Lecture Hour. 2 Lab Hours.
Laboratory experiments in modern physics and physical optics with an introduction to current, state-of-the-art recording techniques.
Prerequisites: PHYS 225, PHYS 309.

PHYS 328 Experimental Physics II
Credit 1. 1 Lecture Hour. 1 Lab Hour.
Laboratory experiments in modern physics and physical optics with an introduction to current, state-of-the-art recording techniques.
Prerequisites: PHYS 225, PHYS 309, PHYS 327.

PHYS 331 Theoretical Methods for Physicists I
Credits 3. 3 Lecture Hours.
Applications involving vectors; vector and additional methods for advanced electricity and magnetism; relationship and solutions of classical wave equation, heat equation, and Schrödinger equation; harmonic motion on finite or periodic lattice and in continuum; tensor and matrix notation in classical mechanics and electricity and magnetism.
Prerequisites: MATH 221 or MATH 251 or MATH 253; MATH 308; PHYS 208 or PHYS 219, PHYS 218, and PHYS 221; restricted to physics majors.

PHYS 332 Theoretical Methods for Physicists II
Credits 3. 3 Lecture Hours.
Methods to solve the important equations of theoretical physics, emphasizing the effects of boundary conditions and quantization on their solutions and restricted to the essential physical symmetries associated with free space, spheres, cylinders, and rectangles; if time permits, introduction to symmetries in physics and to asymptotic methods.
Prerequisites: PHYS 222 or PHYS 309, PHYS 331; restricted to physics majors.

PHYS 401 Computational Physics
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduction to computational and simulational techniques widely used in physics applications and research, including trajectory integration, wave motion analysis, molecular dynamics, Monte Carlo methods, statistical mechanics of spin systems, phase transitions, quantum evolution, bound state problems, and variational methods.
Prerequisites: PHYS 302; PHYS 309; PHYS 331; PHYS 332; knowledge of a high level language such as FORTRAN or C (This prerequisite can be obtained by taking CSCE 206 or the equivalent.); junior or senior classification.

PHYS 408 Thermodynamics and Statistical Mechanics
Credits 4. 4 Lecture Hours.
Statistical method, macroscopic thermodynamics, kinetic theory, black body radiation, Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics.
Prerequisites: PHYS 331; PHYS 412; junior or senior classification.

PHYS 412 Quantum Mechanics I
Credits 3. 3 Lecture Hours.
Postulates of wave mechanics; wave packets; harmonic oscillator; central field problem; hydrogen atom; approximation methods.
Prerequisites: PHYS 302; PHYS 309; PHYS 332; junior or senior classification.

PHYS 414 Quantum Mechanics II
Credits 3. 3 Lecture Hours.
Continuation of PHYS 412. Electron spin; addition of angular momenta; atomic structure; time dependent perturbations; collision theory; application of quantum mechanics to atomic, solid state, nuclear or high energy physics.
Prerequisite: PHYS 412.

PHYS 416 Physics of the Solid State
Credits 3. 3 Lecture Hours.
A survey of solid state physics; an introduction to crystal structures and the physics of electrons, lattice vibrations and photons; applications to semiconductors; magnetism; superconductivity; physics of nanostructures; brief introduction to selected current topics in condensed matter physics.
Prerequisites: PHYS 304 and PHYS 412.

PHYS 420 Concepts, Connections, and Communication
Credit 1. 1 Lecture Hour.
Stars and atoms; new physics; post-Newtonian universe.
Prerequisite: Junior or senior classification.

PHYS 425 Physics Laboratory
Credits 2. 6 Lab Hours.
Experiments in nuclear, atomic, and molecular physics using modern instrumentation and equipment of current research.
Prerequisite: PHYS 327 or equivalent.

PHYS 426 Physics Laboratory
Credits 2. 6 Lab Hours.
Experiments in solid state and nuclear physics. Modern instrumentation and current research equipment are employed.
Prerequisite: PHYS 327 or equivalent.

PHYS 444 Art of Communication in Physics I: Communicating Science to Scientists
Credits 2. 2 Lecture Hours.
Communication in physics, communicating physics to scientists, scientific presentations; scientific writing; information retrieval; reading technical publications.
Prerequisite: Knowledge of oral and written English; junior or senior classification.

PHYS 445 Art of Communication in Physics II: Communicating Science to Non-Scientists
Credit 1. 1 Lecture Hour.
Communication in physics, communicating physics to scientists, scientific presentations; scientific writing; job and graduate school application; job interview.
Prerequisites: PHYS 444; knowledge of oral and written English; junior or senior classification.

PHYS 485 Directed Studies
Credits 1 to 12. 1 to 12 Other Hours.
Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum.
Prerequisite: Approval of department head.

PHYS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified field of physics. May be repeated for credit.
Prerequisite: Approval of instructor.

PHYS 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in physics. May be repeated for credit. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.
PLPA - Plant Pathology (PLPA)

PLPA 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in plant pathology. May be repeated 3 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

PLPA 301 Plant Pathology
Credits 3. 3 Lecture Hours.
Introduction to fundamental principles of plant pathology; diagnosis, cause and control of plant diseases.
Prerequisites: BIOL 113 or BIOL 101; concurrent registration in PLPA 303.

PLPA 303 Plant Pathology Laboratory
Credit 1. 2 Lab Hours.
Isolation, identification of plant pathogens and clinical diagnosis and control of plant diseases.
Prerequisite: PLPA 301 or registration therein.

PLPA 334 Turfgrass Pathology
Credits 3. 3 Lecture Hours. 0 Lab Hours.
Recognizing turfgrass problems and understanding biological mechanisms in the disease process; principles of disease management strategies.
Prerequisite: Junior or senior classification.

PLPA 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems for advanced undergraduates to permit study of subject matter not available in existing courses.
Prerequisites: PLPA 301 and prior approval of instructor or department head.

PLPA 489 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in an identified area of plant pathology. May be repeated for credit.
Prerequisite: PLPA 301 or approval of instructor.

PLPA 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in plant pathology. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

POLS - Political Science (POLS)

POLS 200 Foundations of Political Science
Credits 3. 3 Lecture Hours.
Survey of the scholarly discipline of political science and its theoretical foundations, principal subfields, major research questions and modes of scholarship.

POLS 203 Introduction to Political Theory
Credits 3. 3 Lecture Hours.
Introduction to the study of political theory, with attention to major themes in the history of political thought; discussion of the nature of politics; examination of method in political theory and its relation to the discipline of political science.

POLS 206 American National Government
Credits 3. 3 Lecture Hours.

POLS 207 State and Local Government
Credits 3. 3 Lecture Hours.
(GOV 2306) State and Local Government. Survey of state and local government and politics with special reference to the constitution and politics of Texas.

POLS 209 Introduction to Political Science Research
Credits 3. 3 Lecture Hours.
Introduction to the philosophy and practice of social science and to modes of research in major subfields of political science.
Prerequisite: Political science majors must have completed POLS 209 before they enroll in their last 18 hours of 300- and 400-level POLS courses. This means a student may take no more than 6 hours of upper division (300- and 400-level courses) before completing POLS 209. Enrollment is restricted to political science majors.

POLS 229 Introduction to Comparative Politics
Credits 3. 3 Lecture Hours.
A comparison of political institutions, processes and issues across a wide variety of political systems.

POLS 231 Introduction to World Politics
Credits 3. 3 Lecture Hours.
Analysis of contemporary world from point of view of nation-state; political problems, factors involved in foreign policies and relations of nations.

POLS 232 Introduction to Public Policy
Credits 3. 3 Lecture Hours.
Introduction to public policy; social, economic, political and cultural contexts of public policy; study of policy analysis and policymakers; examines public problems, policy choice, and limits of governmental action.

POLS 233 Politics and Policy in the United States
Credits 3. 3 Lecture Hours.
Survey of institutions of American government, mass political behavior, and policy fields of significant contemporary importance.

POLS 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Individual instruction in selected aspects of political science not adequately covered by other courses.
Prerequisite: Approval of department head.

POLS 289 Special Topics in...
Credits 3. 3 Other Hours.
Selected topics in an identified area of political science and public policy. May be taken for credit seven times.
Prerequisite: POLS 206 or approval of department head.

POLS 291 Research
Credits 0 to 6. 0 to 6 Other Hours.
Research conducted under the direction of a faculty member in political science. May be taken three times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.
POLS 302 The Mass Media and Politics  
Credits 3. 3 Lecture Hours.  
Examination of mass media impact on politics and political behavior, and governmental impact on the mass media.  
Prerequisite: POLS 206 or approval of department head; junior or senior classification.  
Cross Listing: COMM 302.

POLS 304 Latino Politics in the United States  
Credits 3. 3 Lecture Hours.  
Survey of historical and contemporary issues in Latino politics in the U.S.; race and ethnicity in the context of U.S. politics; comparisons of racial and ethnic group experiences in the U.S. with those experienced by racial and ethnic groups elsewhere; Latino access to the political system through political participation.  
Prerequisite: Junior or senior classification.

POLS 306 Contemporary Political Problems and Issues  
Credits 3. 3 Lecture Hours.  
Major contemporary political problems and issues with primary emphasis on the U.S. Each term one to three problems or issues will be examined in some depth. Students may register in up to but no more than two different sections of this course. May be repeated for credit.  
Prerequisite: POLS 206 or approval of department head. NOTE: POLS 306 courses taken in a study abroad program may not count toward this limit; please consult with the undergraduate advisor.

POLS 307 The Texas Legislature  
Credits 3. 3 Lecture Hours.  
Examination of contemporary political problems and issues in the Texas Legislature.  
Prerequisites: POLS 206 and POLS 207; junior or senior classification.

POLS 308 Game Theoretic Methods in Political Science  
Credits 3. 3 Lecture Hours.  
Core concepts of game theory to study strategic interaction in politics; game theory using simple mathematical models to describe social situations, understand political and social phenomena; emphasis on model building skills and problem solving.  
Prerequisites: POLS 206 and junior or senior classification or approval of department head.

POLS 309 Polimetrics  
Credits 3. 3 Lecture Hours.  
Theory, techniques, and application of quantitative analysis in political science; focus on quantitative techniques commonly used to evaluate empirical theories of politics.  
Prerequisites: POLS 209 or equivalent and 9 additional hours of political science or approval of instructor.

POLS 312 Ethnic Conflict  
Credits 3. 3 Lecture Hours.  
Examination of government institutions designed to structure ethnic relations; source of ethnic conflict; mechanisms to facilitate the peaceful resolution of ethnic conflict.  
Prerequisite: Junior or senior classification.

POLS 313 Public Opinion  
Credits 3. 3 Lecture Hours.  
Role of public opinion in a democratic political system—its formation, properties and patterns, with special attention to problems of linking public opinion to public policy.  
Prerequisite: POLS 206 or approval of department head.

POLS 314 Interest Groups  
Credits 3. 3 Lecture Hours.  
Role of interest groups in politics; types of groups and resources; internal dynamics; group strategies/tactics (including PACs); forms of indirect and direct lobbying; influence of groups in political arena.  
Prerequisite: POLS 206 or approval of department head.

POLS 315 Political Parties  
Credits 3. 3 Lecture Hours.  
Organization, history, and activities of political parties and functions they serve in national, state and local politics in the United States and elsewhere.  
Prerequisite: POLS 206 or approval of department head.

POLS 316 Urban Politics  
Credits 3. 3 Lecture Hours.  
Politics at the community level; urban and metropolitan political systems.  
Prerequisites: POLS 206 and POLS 207 or approval of department head.

POLS 317/WGST 317 Women in Politics  
Credits 3. 3 Lecture Hours.  
Role of women in the political system; treatment of women in political theory; effect of law on women's status; women as political leaders; current policy issues of concern to women.  
Prerequisite: POLS 206.  
Cross Listing: WGST 317/POLS 317.

POLS 318 Theories of International Relations  
Credits 3. 3 Lecture Hours.  
Examination of major paradigms of international relations; focus on theory development and application to cases.  
Prerequisites: POLS 206, POLS 209, and junior or senior classification or approval of department head.

POLS 319 The American Presidency  
Credits 3. 3 Lecture Hours.  
The American Presidency and the primary relationships and responsibilities of the office, dealing with the public, decision making, influencing Congress, and implementing policy.  
Prerequisite: POLS 206 or approval of department head.

POLS 320 Race and Politics in the United States  
Credits 3. 3 Lecture Hours.  
The politics of race in the United States: contrast of the political experiences of racial groups with the ideals and realities of democratic political systems.  
Prerequisites: POLS 206 and POLS 207 and junior or senior classification.

POLS 322 Western European Government and Politics  
Credits 3. 3 Lecture Hours.  
Political institutions and ideas of major European countries. Prospects for political integration.  
Prerequisite: POLS 206 or approval of department head.

POLS 323 Political Systems of Latin America  
Credits 3. 3 Lecture Hours.  
Survey of the major features of the political process in Latin America; key political groups and sources and characteristics of their political power; studies of selected countries.  
Prerequisite: POLS 206 or approval of department head.
POLS 324 Politics of Global Inequality
Credits 3.3 Lecture Hours.
Examination of the causes and consequences of economic inequality between rich and poor states; evaluation of competing explanations for poverty of less-developed countries; development strategies employed by poor states; and structure of global economic relations.
Prerequisite: Junior or senior classification.

POLS 325
Credits 3.3 Lecture Hours.
African Politics. Survey of African politics from pre-colonial period to contemporary era; examination of local experience of democracy, governance, economic development in light of varied colonial experiences, independence movements, international political economy, informal sources of political power.
Prerequisites: POLS 206 and POLS 207; junior or senior classification.

POLS 326 Government and Politics of Eastern Europe
Credits 3.3 Lecture Hours.
Political, social and economic transformations in the post-Communist Eastern and Southern European countries; examination of the interrelations between political, economic and social issues that impact the building of new governments and institutions in these countries.
Prerequisites: POLS 206 and POLS 207; junior or senior classification.

POLS 327 Congressional Politics
Credits 3.3 Lecture Hours.
Prerequisite: POLS 206 or approval of department head.

POLS 328 Globalization and Democracy
Credits 3.3 Lecture Hours.
Examination of the political and economic origins of globalization; effects of globalization on advanced industrial democracies; effect on less developed nations; evaluation of the economic, social, cultural and political consequences of globalization.
Prerequisite: Junior or senior classification.

POLS 333 International Cooperation
Credits 3.3 Lecture Hours.
Contemporary issues, problems, and solutions in international cooperation.
Prerequisites: POLS 206; junior or senior classification or approval of department head.

POLS 335 International Conflict
Credits 3.3 Lecture Hours.
Examination of major theoretical explanations of war and conflict resolution.
Prerequisites: POLS 206; junior or senior classification or approval of department head.

POLS 338 Government and Politics of the Former Soviet Union
Credits 3.3 Lecture Hours.
Major political issues of the post-communist transition in the former Soviet Union.
Prerequisite: POLS 206 or approval of department head.

POLS 340 Introduction to Public Administration
Credits 3.3 Lecture Hours.
American public administration; development of public service; the political and constitutional context; organization theory; leadership and decision-making; personnel and resource staff functions; administrative law and regulation; ethics and administrative accountability.
Prerequisite: POLS 206 or approval of department head.

POLS 341 Urban Administration
Credits 3.3 Lecture Hours.
Practices and problems of city government. Organization, administration, and planning and their relation to political processes and structure.
Prerequisites: POLS 206 and 207 or approval of department head.

POLS 342 Politics and Bureaucracy
Credits 3.3 Lecture Hours.
Public bureaucracy in the context of a political environment; role of experts, the use of political power and problems of bureaucratic accountability and responsibility.
Prerequisite: POLS 206 or approval of department head.

POLS 347 Politics of Energy and the Environment
Credits 3.3 Lecture Hours.
U.S. energy and environmental problems and politics and the political, legal, and institutional factors influencing their development and implementation.
Prerequisites: POLS 206 or approval of department head. Junior or senior classification or approval of instructor.

POLS 349 Early Political Thought
Credits 3.3 Lecture Hours.
Political thought from Greek antiquity to Renaissance.
Prerequisite: POLS 206 or approval of department head.

POLS 350 Modern Political Thought
Credits 3.3 Lecture Hours.
Political thought from Machiavelli to Marx.
Prerequisite: POLS 206 or approval of department head.

POLS 351 Law and Legislation
Credits 3.3 Lecture Hours.
Legal, political and institutional factors that influence the passage of legislation in American legislative bodies.
Prerequisites: POLS 206 and POLS 207; junior or senior classification.

POLS 352 Empirical Democratic Theory
Credits 3.3 Lecture Hours.
Examination of empirical political science theory about the nature and consequences of democratic government in the modern era; study of scientific theory that accounts for the rise, characteristics and behavior of democratic political systems.
Prerequisites: POLS 206, POLS 207, and POLS 209; junior or senior classification.

POLS 353 Constitutional Rights and Liberties
Credits 3.3 Lecture Hours.
Legal issues, controversies and significant developments in constitutional rights and liberties, and the impact of these developments upon American politics, culture and social institutions.
Prerequisite: POLS 206 or approval of department head.

POLS 355 United States Constitutional Development
Credits 3.3 Lecture Hours.
Leading decisions of the Supreme Court. Trends in our constitutional development since 1789; expansion through judicial interpretation of powers delegated to national government.
Prerequisites: POLS 206 and HIST 105 or approval of department head.
POLS 356 Law, Politics and Policy  
Credits 3.3 Lecture Hours.  
An introduction to the American legal system, its development and structure: the role of lawyers, law enforcement agencies, and interest groups in its operation; the dynamics of civil litigation and criminal processes of courts; the impact of legal policies on society, politics and the economy.  
Prerequisite: POLS 206 or approval of department head.

POLS 357 National Judicial Politics  
Credits 3.3 Lecture Hours.  
Political factors that influence judicial selection; decision making and policy-making roles and impact of the U.S. Supreme Court and Federal Court System.  
Prerequisites: POLS 206, POLS 209, and junior or senior classification or approval of department head.

POLS 358 Comparative Judicial Politics  
Credits 3.3 Lecture Hours.  
Survey of the major features of court systems of the world; examination of the role played by courts in the politics of selected nations of the world; comparison of judicial decision making in selected counties; the impact of courts in developing democracies.  
Prerequisites: POLS 206 and 207; junior or senior classification.

POLS 359 American Political Thought  
Credits 3.3 Lecture Hours.  
American political thought from colonial times to the present.  
Prerequisite: POLS 206 or approval of department head.

POLS 360 American State Politics  
Credits 3.3 Lecture Hours.  
American state governments; comparative state policies and politics.  
Prerequisite: POLS 207 or approval of department head.

POLS 362 Latin American Political Thought  
Credits 3.3 Lecture Hours.  
Survey of various traditions in the history of Latin American political thought; key texts in the history of political theory in the Spanish-American continent.  
Prerequisites: POLS 206; junior or senior classification or approval of instructor.

POLS 364 Global Political Thought  
Credits 3.3 Lecture Hours.  
Global perspective on the history of political ideas and contemporary political philosophy; confrontation and conversion of East Asia and Middle Eastern concepts of political problems and Western perspectives; impact of culture on the shaping of political ideas.  
Prerequisite: Junior or senior classification.

POLS 365/ASIA 365 Asian Governments and Politics  
Credits 3.3 Lecture Hours.  
Contemporary political systems of Asia, political institutions, actors and processes.  
Prerequisite: POLS 206 or approval of department head.  
Cross Listing: ASIA 365/POLS 365.

POLS 366 Political Conflicts of the Middle East  
Credits 3.3 Lecture Hours.  
This course seeks to provide students with an understanding of the internal, regional and international politics of the Middle East; with a focus on selected political conflicts and the influence of the region's cultures, religions and natural resources, as well as outside political forces.  
Prerequisites: POLS 206. Junior or senior classification or approval of instructor.

POLS 367/WGST 367 Women in Government in Comparative Perspective  
Credits 3.3 Lecture Hours.  
Examination of women's representation in government based on comparison across multiple nation-states; focus on legislative and executive branches of democratic governments.  
Prerequisites: POLS 206; junior or senior classification or approval of department head.  
Cross Listing: WGST 367/POLS 367.

POLS 368 Latin American Legislatures  
Credits 3.3 Lecture Hours.  
Survey of the major features of the legislative branch in Latin America; examination of the role played by legislatures in the politics of selected countries; studies of executive-legislative relations in selected countries; participation by traditionally excluded groups in legislatures.  
Prerequisites: POLS 206, junior or senior classification or approval of department head.

POLS 369 Theories of Democracy  
Credits 3.3 Lecture Hours.  
Definitions and justifications of democratic political systems; criticisms of democratic legitimacy, difficulties encountered by actual democratic regimes; methodological problems of assessing the fulfillment of democratic goals.  
Prerequisite: POLS 206 or approval of instructor.

POLS 375 Campaigns and Elections  
Credits 3.3 Lecture Hours.  
Theories of voter choice; effects of mass media and campaign finance regulations on the conduct and outcome of elections; effects of elections on policy; emphasis on U.S. national elections.  
Prerequisite: POLS 206 or approval of department head.

POLS 412 International Political Economy  
Credits 3.3 Lecture Hours.  
Politics of international economic relations; interactions between political and economic realms in the contemporary world.  
Prerequisites: POLS 206; junior or senior classification or approval of department head.

POLS 413 American Foreign Policy  
Credits 3.3 Lecture Hours.  
Evolution of U.S. foreign policies since World War II. Policy process; role of executive, legislative, bureaucratic and private institutions; current foreign policy issues and problems.  
Prerequisite: POLS 206 or approval of department head.

POLS 415 Contemporary Issues in American Foreign Policy  
Credits 3.3 Lecture Hours.  
Detailed analysis of a selected aspect of American foreign policy.  
Prerequisite: POLS 206 or approval of department head.
POLS 423 U.S.-Latin American Relations
Credits 3. 3 Lecture Hours.
Political, economic and social relations between the United States and Latin American nations from independence to the present.
Prerequisites: POLS 206, POLS 207, POLS 323; junior or senior classification.

POLS 424 Comparative Governmental Institutions
Credits 3. 3 Lecture Hours.
Study of the politics and structure of governmental institutions in a comparative venue; examination of the building blocks by which patterns of governments and institutions can be identified across various political systems of the world; role of institutions across different types of political systems and how they are affected by global economic factors.
Prerequisites: POLS 322, POLS 323, POLS 326, or POLS 365/ASIA 365; junior or senior classification.

POLS 429 Issues in World Politics
Credits 3. 3 Lecture Hours.
Selected issues of importance in contemporary world politics. May be repeated for credit.
Prerequisite: POLS 206 or approval of department head.

POLS 432 The Politics of European Union
Credits 3. 3 Lecture Hours.
Examination of the institutional, economic and political forces that led to the development of the European Economic Union; impact of the European Union on world affairs.
Prerequisites: POLS 206 and POLS 207; junior or senior classification.

POLS 435 Voting Behavior
Credits 3. 3 Lecture Hours.
Voting decisions, electoral behavior and consequences for the political system.
Prerequisite: POLS 206 or approval of department head.

POLS 439 Foreign Policy Decision Making
Credits 3. 3 Lecture Hours.
Examination of decision processes in contemporary world politics; individual, group and organizational aspects of decision making in the context of world events.
Prerequisites: POLS 206, POLS 209, and junior or senior classification or approval of department head.

POLS 440 Public Policies and Policymaking
Credits 3. 3 Lecture Hours.
Socio-economic, political, and institutional factors as they affect the development, implementation and impact of public policies. Strategies of choice by political regimes in the formation of public policies.
Prerequisite: POLS 206 or approval of department head.

POLS 441 State and Local Financial Administration
Credits 3. 3 Lecture Hours.
Financial management practices in state and local governments including the impact of management practices and political factors on revenues, expenditures, budgeting and debt financing.
Prerequisite: POLS 207.

POLS 442 Social Welfare Policy
Credits 3. 3 Lecture Hours.
Political and social issues involved in social welfare and income security policies; problems of poverty and public welfare in the United States.
Prerequisite: POLS 206 or approval of department head.

POLS 447 National Security Policy
Credits 3. 3 Lecture Hours.
Need for national security policy, the factors involved in determining defense policy and the resulting problems; special attention to the United States.
Prerequisite: POLS 206 or approval of department head.

POLS 454 Contemporary Political Ideas
Credits 3. 3 Lecture Hours.
Contemporary political ideas such as liberalism, socialism, communism and fascism; role of ideology in political change.
Prerequisite: POLS 206 or approval of department head.

POLS 455 Traditions of Political Theory
Credits 3. 3 Lecture Hours.
Survey of particular schools or historical periods of normative political theory. May be taken three times.
Prerequisites: POLS 206 and POLS 207; junior or senior classification.

POLS 456 Environmental Political Theory
Credits 3. 3 Lecture Hours.
Examination of classical and contemporary theories of politics and the environment, overview of main lines of thought on how human beings should interact with and manage the physical environment, with attention to the particular problems raised by these issues for political theory.
Prerequisites: POLS 206; junior or senior classification.

POLS 461 Jurisprudence
Credits 3. 3 Lecture Hours.
History of legal philosophy from the ancient Greeks to the present; exploration of recurring themes such as natural law, legal positivism, legal realism, sociological jurisprudence and Marxist jurisprudence; exposure to various issues, such as liberty, privacy, obedience, responsibility and punishment.
Prerequisite: POLS 206 or approval of department head.

POLS 462/WGST 462 Women and the Law
Credits 3. 3 Lecture Hours.
The legal status of American women from the adoption of the Constitution to the present: constitutional developments; the 19th Amendment and the proposed Equal Rights Amendment; employment; family law; reproductive rights; education; sexual equality in context of other claims to equality; law and social norms.
Prerequisite: POLS 206 or approval of department head. Cross Listing: WGST 462/POLS 462.

POLS 475 Government and the Economy
Credits 3. 3 Lecture Hours.
Constitutional and legal framework of governmental involvement in economy; governmental budget in management of business cycle; regulation of business activities; governmental economic planning in democratic societies.
Prerequisite: POLS 206 or approval of department head.

POLS 481 Research Seminar
Credits 3. 3 Other Hours.
In-depth study of topics associated with particular sub-field of political science; experience designing and implementing major, original research project.
Prerequisites: POLS 206, POLS 207, POLS 209, 12 credits in POLS at or above 300 level; junior or senior political science major or approval of instructor.
POLS 484 Internship
Credits 0 to 3. 0 to 3 Other Hours.
Directed internship in a public organization to provide students with on-the-job training and applied research experience with professionals in settings appropriate to the student's degree plan and career objectives. May be taken three times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Majors only; approval of department head.

POLS 485 Directed Studies
Credits 0 to 6. 0 to 6 Other Hours.
Individual instruction in selected aspects of political science not adequately covered by other courses.
Prerequisite: Approval of department head.

POLS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of political science and public policy. May be repeated for credit.
Prerequisite: POLS 206 or approval of department head.

POLS 491 Research
Credits 0 to 6. 0 to 6 Other Hours.
Research conducted under the direction of a faculty member in political science. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

POLS 497 Independent Honors Studies
Credits 0 to 4. 1 to 4 Other Hours.
Directed independent studies for upper division Honors students, regardless of academic major, in selected aspects of political science.
Prerequisites: Junior or senior classification either as Honors student or with overall GPR of 3.25; letter of approval from head of student's major department.

PORT - Portuguese (PORT)

PORT 101 Beginning Portuguese I
Credits 4. 4 Lecture Hours. 1 Lab Hour.
(PORT 1411) Beginning Portuguese I. Elementary language study with aural, oral, written, and reading practice; preparation for conversation; part of class preparation done in language laboratory. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course.

PORT 102 Beginning Portuguese II
Credits 4. 4 Lecture Hours. 1 Lab Hour.
(PORT 1412) Beginning Portuguese II. Continuation of PORT 101; part of class preparation done in language laboratory. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course.
Prerequisite: PORT 101 with a grade of C or better.

PORT 201 Intermediate Portuguese I
Credits 3. 3 Lecture Hours.
(PORT 2311) Intermediate Portuguese I. Readings of average difficulty; review of grammar, practice in conversation and composition. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course.
Prerequisite: PORT 102 with a grade of C or better.

PORT 202 Intermediate Portuguese II
Credits 3. 3 Lecture Hours.
(PORT 2312) Intermediate Portuguese II. Continuation of PORT 201 with more advanced material. Students with prior knowledge of or instruction in Portuguese are required to take a placement test before enrolling for the first time in a college Portuguese course.
Prerequisite: PORT 201 with a grade of C or better.

POSC - Poultry Science (POSC)

POSC 201 General Avian Science
Credits 3. 3 Lecture Hours.
Introduction to the poultry industry to include past, present and future industry dynamics; avian anatomy/physiology as they impact commercial production; management principles and practices of breeding, incubation, brooding, nutrition, disease control and marketing technology.

POSC 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed studies in specific problem areas of poultry science.
Prerequisite: Approval of instructor.

POSC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of poultry science. May be repeated for credit.
Prerequisite: Approval of instructor.

POSC 291 Research
Credits 1 to 2. 1 to 2 Other Hours.
Research conducted under the direction of faculty member in poultry science. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor and department head.

POSC 302 Avian Science Laboratory
Credit 1. 2 Lab Hours.
Field trips and application of basic skills in production of poultry meat and eggs. Recommended supplement to POSC 201.
Prerequisite: Junior or senior classification or approval of instructor.

POSC 304 Judging
Credits 3. 6 Other Hours.
Intensive, individualized training in selection standards for meat and egg strains of poultry, grading standards for egg and live and ready-to-cook poultry, and organizing and managing poultry shows. Practice requires visits to processing plants.
Prerequisite: Junior or senior classification or approval of instructor.

POSC 308 Avian Anatomy and Physiology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Anatomy and physiology of the major body systems of the bird, including the cardiovascular, gastrointestinal, respiratory, endocrine and reproductive systems; influence of the environment on bird physiology, including effects of stress. Laboratory exercises include dissection and microscopic analysis of the major body system and assessment of environmental conditions.
Prerequisites: BIOL 111; POSC 201; junior or senior classification or approval of instructor.
POSC 309 Poultry Meat Production  
Credits 4. 3 Lecture Hours. 2 Lab Hours. 
Modern integrated broiler and turkey production; housing and equipment, nutrition, flock health, pest control, grower relations, marketing and financial management; lab involves blood testing, growth trials, posting birds, processing, and observation of a local integrated poultry operation. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 313 Game Birds and Ornamental Fowl  
Credits 3. 3 Lecture Hours. 
Commercial game bird production; nutrition, incubation, rearing, breeder care, diseases, marketing, housing requirements and economic considerations; management of rare and ornamental fowl. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 319 Breeder and Hatchery Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours. 
Housing and equipment, incubation technology, embryology, nutrition and flock health; lab involves hatchery management, blood testing, semen evaluation, artificial insemination, basic embryology and observation of a local hatchery. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 326 Commercial Egg Industry  
Credits 3. 3 Lecture Hours. 
Production, management, marketing, economics and integration of commercial laying hen operations. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 333 Instincts and Behavior  
Credits 3. 3 Lecture Hours. 
Investigation of the reasoning behind evolved reproductive strategies with integration of veterinary and avian science perspectives; examination of individual differences in behavior and their development in particular environments. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 381 Investigation of Professional Development in Poultry Science  
Credits 2. 2 Other Hours. 
An investigation of career options and the research process as applied to poultry science. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 402 Skills in Poultry Evaluation  
Credit 1. 2 Lab Hours. 
Practical application of judging and husbandry skills used in poultry exhibition and production. Primarily designed for preservice vocational agriculture teachers. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 405/FSTC 405 Egg and Poultry Meat Processing  
Credits 3. 3 Lecture Hours. 
Principles of egg and poultry meat processing, understanding egg and poultry meat markets, egg and meat grading, product safety, packaging and consumer acceptance of shell eggs and poultry meat; specifically turkey and broilers. 
Prerequisite: Junior or senior classification or approval of instructor. 
Cross Listing: FSTC 405/POSC 405.

POSC 406/FSTC 406 Poultry Further Processing  
Credits 4. 3 Lecture Hours. 2 Lab Hours. 
Science and practice of value-added products; physical, chemical, microbiological and functional characteristics of value-added poultry products as they affect consumer acceptance, efficiency of production and regulatory approval. 
Prerequisites: CHEM 222; DASC 326/FSTC 326/FSTC 326/DASC 326; POSC 309; POSC 405/FSTC 405; junior or senior classification or approval of instructor. 
Cross Listing: FSTC 406/POSC 406.

POSC 411 Poultry Nutrition  
Credits 3. 3 Lecture Hours. 
Principles of poultry nutrition with emphasis on all major nutrient classes and their relationships with the avian digestive system. 
Prerequisites: CHEM 222 or equivalent; junior or senior classification or approval of instructor.

POSC 412 Poultry Feed Formulation  
Credit 1. 1 Lecture Hour. 
Practical feeding of poultry with emphasis on specific nutrient requirements of various species and computer least cost diet formulations. 
Prerequisites: POSC 411; junior or senior classification or approval of instructor.

POSC 414 Avian Genetics and Breeding  
Credits 3. 2 Lecture Hours. 2 Lab Hours. 
Basic concepts of avian genetics and breeding principles, inheritance of economically important qualitative and quantitative traits; statistical analysis of breeding results; application of molecular genetics, mating systems analyses, breeder management, and incubation of hatching eggs. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 425 Environmental Physiology  
Credits 3. 3 Lecture Hours. 
Environmental influences on the physiology of animals and humans; review of shelter engineering to promote animal welfare and production during stressful climatic conditions. Chronic and acute stress in a variety of birds and animals. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 427 Animal Waste Management  
Credits 3. 3 Lecture Hours. 
An applied approach to current and emerging issues relating to responsible management of animal waste; the role of biological aspects of production management decisions evaluated in an examination of regulatory and environmental requirements; current case studies and exposure to field situations. Field trips may be required for which departmental fees may be assessed. 
Prerequisite: Junior or senior classification or approval of instructor.

POSC 429 Advanced Food Bacteriology  
Credits 4. 3 Lecture Hours. 2 Lab Hours. 
Microbiology of foodborne human pathogens of food animals, raw and processed food, and human disease; methods to control incidence of pre- and post-harvest contamination. 
Prerequisites: DASC 326/FSTC 326 or FSTC 326/DASC 326 or BIOL 351 or VTPB 405; junior or senior classification.
POSC 444 International Poultry Production  
Credits 3. 3 Lecture Hours.  
Two-week intensive and comparative on-site study of international poultry production; rearing and husbandry, housing and equipment, nutrition, flock health and processing.  
**Prerequisite:** Junior or senior classification.

POSC 454 Animal Welfare  
Credits 3. 3 Lecture Hours.  
Issues from an animal's perspective; opportunities to study the general questions that typically affect the welfare of an animal; insight to practices that can be used to improve the welfare of an animal.  
**Prerequisite:** Junior or senior classification.

POSC 481 Poultry Science Systems  
Credits 2. 1 Lecture Hour. 2 Lab Hours.  
Individual and team approaches for the collection, interpretation, synthesis and presentation of information on integration of all aspects of the poultry industry to address issues facing it; emphasis on oral and written communication.  
**Prerequisite:** Senior classification.

PSYC 107 Introduction to Psychology  
Credits 3. 3 Lecture Hours.  
(PSYC 2301) Introduction to Psychology. Introductory course dealing with elementary principles of human behavior.

PSYC 206/AFST 206 Black Psychology  
Credits 3. 3 Lecture Hours.  
Critical examination of psychological experience, theories, and methods from perspectives grounded in the "Black experience."  
**Cross Listing:** AFST 206/PSYC 206.

PSYC 208/AFST 208 Stereotypes, Prejudice, and Minority Experience  
Credits 3. 3 Lecture Hours.  
Overview of theory and research relating to stereotyping, prejudice, discrimination, and minority experiences from a social psychological perspective.  
**Prerequisite:** PSYC 107.  
**Cross Listing:** AFST 208/PSYC 208.

PSYC 209/AFST 209 Psychology of Culture and Diversity  
Credits 3. 3 Lecture Hours.  
Introduction to various issues surrounding an increasingly interconnected and globalized world by critically examining the dynamic relationship between psychological processes and diverse (e.g., motivation, memory, self, prejudice) socio-cultural contexts.  
**Prerequisite:** PSYC 107.  
**Cross Listing:** AFST 209/PSYC 209.

PSYC 210/WGST 210 Psychological Aspects of Human Sexuality  
Credits 3. 3 Lecture Hours.  
Interface between human sexuality, reproductive development, and gender roles across the lifespan; theoretical and research literature promotes understanding of hormonal influences, learning processes, cultural differences, sexual response, and love and attraction.  
**Prerequisite:** PSYC 107.  
**Cross Listing:** WGST 210.

PSYC 251 Survey of Industrial/Organizational Psychology  
Credits 3. 3 Lecture Hours.  
Literature and research in the basic theories and practices of I/O psychology including selection, testing, job analysis, performance appraisal, training, employee motivation, job satisfaction, leadership, and group processes within organizations. Students may not receive credit for both PSYC 251 and PSYC 352 or PSYC 251 and PSYC 353.

PSYC 285 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Directed study of selected problems not covered by other courses in the department. Content of course will be adapted to interest and needs of students.  
**Prerequisites:** Junior or senior classification and approval of instructor.

PSYC 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of psychology. May be repeated for credit.  
**Prerequisites:** Junior or senior classification and approval of instructor.

PSYC 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in psychology. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.  
**Prerequisites:** Junior or senior classification and approval of instructor and department head.

**PSYC - Psychology (PSYC)**

PSYC 107 Introduction to Psychology  
Credits 3. 3 Lecture Hours.  
(PSYC 2301) Introduction to Psychology. Introductory course dealing with elementary principles of human behavior.

PSYC 206/AFST 206 Black Psychology  
Credits 3. 3 Lecture Hours.  
Critical examination of psychological experience, theories, and methods from perspectives grounded in the "Black experience."  
**Cross Listing:** AFST 206/PSYC 206.
PSYC 301 Elementary Statistics for Psychology  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Practical knowledge of statistics up through analysis of variance. Practice sessions devoted to numerical problems. Will not satisfy mathematics requirement in College of Liberal Arts curricula.  
Prerequisites: PSYC 107; MATH 140 or MATH 150 with a grade of C or better, MATH 141, MATH 142, MATH 166, MATH 151, MATH 171, MATH 131, or MATH 147; major in psychology; junior or senior classification or approval of instructor.  

PSYC 302 Research Methods and Design in Psychology  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Research techniques in psychology with emphasis on the experimental method; laboratory exercises applied to specific problems in psychology.  
Prerequisites: PSYC 107 and PSYC 301; major in psychology.  

PSYC 303 Psychology of Women of Color  
Credits 3. 3 Lecture Hours.  
Interdisciplinary theories to study the unique yet intersectional experiences of women from different racial groups, ethnicities, nationalities and cultural backgrounds; scholarly research from the diversity science field; contemporary topics that have developed in a global context; examination of complex issues, which affect women of color across the lifespan.  
Prerequisite: Grade of C or better in AFST 201 or PSYC 107 or WGST 200, or approval of instructor.  
Cross Listing: AFST 303 and WGST 303.  

PSYC 304 Psychology of Sport and Physical Activity  
Credits 3. 3 Lecture Hours.  
The relationship of psychology to sport; topics include history, application of learning principles, social psychology, personality variables, psychological assessment, youth sport, women in sport, the psychology of coaching, sports law and ethics.  
Prerequisite: Junior or senior classification.  

PSYC 305 Psychology of Adjustment  
Credits 3. 3 Lecture Hours.  
Adjustment problems of normal people; application of psychological principles to family, school and community life.  

PSYC 306 Abnormal Psychology  
Credits 3. 3 Lecture Hours.  
Survey of behavior pathology; functional and organic psychoses, psychoneurosis, character disorders, psychophysiological disorders, alcohol and drug addiction and mental retardation; therapeutic and diagnostic methods.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 307 Developmental Psychology  
Credits 3. 3 Lecture Hours.  
Growth and development of normal child from infancy to adolescence with emphasis on elementary school years.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 311/NRSC 311 Psychology of Animal Behavior  
Credits 3. 3 Lecture Hours.  
Problems, principles, and methods of animal psychology; animal learning, motivation, discriminative processes and abnormal, social and instinctual behaviors.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  
Cross Listing: NRSC 311/PSYC 311.  

PSYC 315 Social Psychology  
Credits 3. 3 Lecture Hours.  
Social psychological variables operating on the individual; results of experimental laboratory findings; interaction of personality and social behavior.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 319 History and Systems of Psychology  
Credits 3. 3 Lecture Hours.  
Historical analysis of pre-scientific psychology in philosophy and physiology through the period of the psychological "schools."  
Prerequisite: PSYC 107.  

PSYC 320/NRSC 320 Sensation-Perception  
Credits 3. 3 Lecture Hours.  
Review of sensory physiology, sensory and perceptual phenomena and the major perceptual theories; current research in the field.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  
Cross Listing: NRSC 320/PSYC 320.  

PSYC 323 Psychology of Adolescence  
Credits 3. 3 Lecture Hours.  
Psychological problems of normal teenage individual; ways and means of aiding youth to meet these problems constructively.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 330 Personality  
Credits 3. 3 Lecture Hours.  
Review of personality theories, techniques of assessment and research relevant to understanding individual differences.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 331/NRSC 331 Social Neuroscience  
Credits 3. 3 Lecture Hours.  
Integration of biological and psychological explanations of social behavior; recent research and theories in social neuroscience; emotion, motivation, aggression, face processing, empathy, social cognition, and social relationships.  
Prerequisites: PSYC 107 or approval of instructor; junior or senior classification.  
Cross Listing: NRSC 331/PSYC 331.  

PSYC 332/NRSC 332 Neuroscience of Learning and Memory  
Credits 3. 3 Lecture Hours.  
Brain mechanisms of learning and memory from molecular to behavioral levels; synaptic plasticity, model systems, multiple memory systems, diseases of learning and memory.  
Prerequisites: PSYC 107 or approval of instructor; junior or senior classification.  
Cross Listing: NRSC 332/PSYC 332.  

PSYC 333/NRSC 333 Biology of Psychological Disorders  
Credits 3. 3 Lecture Hours.  
Neurobiology and clinical explanation of molecular mechanisms underlying psychiatric disorders and their drug treatments; depression and bipolar, anxiety disorders, mood disorders, psychosis and schizophrenia.  
Prerequisites: PSYC 107, PSYC 335/NRSC 335 or one year of biology and junior or senior classification.  
Cross Listing: NRSC 333/PSYC 333.
PSYC 335/NRSC 335 Physiological Psychology  
Credits 3. 3 Lecture Hours.  
Physiological bases of sensation, motor functions, emotion, motivation and complex psychological processes.  
Prerequisites: 6 hours of biology; PSYC 301 and PSYC 302 or junior or senior classification.  
Cross Listing: NRSC 335/PSYC 335.  

PSYC 336/NRSC 336 Drugs and Behavior  
Credits 3. 3 Lecture Hours.  
Physiological, pharmacological and behavioral effects of psychoactive drugs, including short-term and long-term effects of psychoactive drugs, properties of addictive drugs, etiology of addiction, and treatments of drug addiction and withdrawal.  
Prerequisites: PSYC 335/NRSC 335 or NRSC 335/PSYC 335; junior or senior classification.  
Cross Listing: NRSC 336/PSYC 336.  

PSYC 340/NRSC 340 Psychology of Learning  
Credits 3. 3 Lecture Hours.  
Survey of significant concepts, experimental methods and principles of learning.  
Prerequisites: PSYC 107 or INST 301; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 345 Human Cognitive Processes  
Credits 3. 3 Lecture Hours.  
Human cognition and information processing: perception, attention, memory, reasoning and problem solving; experimental methods and data, and contemporary theories of human cognition.  
Prerequisites: PSYC 107; PSYC 301 and PSYC 302; or junior or senior classification.  

PSYC 346 Psychology of Language  
Credits 3. 3 Lecture Hours.  
Examines theories of how language is acquired, comprehended, produced, stored and used in normal and brain-impaired individuals.  
Prerequisites: PSYC 107; or junior or senior classification.  

PSYC 350/NRSC 350 Science of Mind and Brain  
Credits 3. 3 Lecture Hours.  
Research in cognitive neuroscience; methodological advances that enable the study of the human brain safely in the laboratory; complex aspects of the mind like emotion, social behavior and consciousness.  
Prerequisite: Junior or senior classification.  
Cross Listing: NRSC 350/PSYC 350.  

PSYC 352 Organizational Psychology  
Credits 3. 3 Lecture Hours.  
Literature and research in basic theories and practices of organizational psychology including employee motivation, leadership, job satisfaction, counterproductive work behaviors, organizational commitment, culture, climate, communication, and group processes within organizations.  
Prerequisites: PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 353 Personnel Psychology  
Credits 3. 3 Lecture Hours.  
Literature and research in basic theories and practices of personnel psychology including job analysis, testing and validation, selection, performance appraisal, training, and legal issues in employment decision making.  
Prerequisites: PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 354 Conflict and Negotiation  
Credits 3. 3 Lecture Hours.  
Examination of the field of conflict and negotiation, including the structure and causes of common interpersonal, intragroup, and intergroup conflicts, effective negotiation strategies, ethics, mediation, and the development of negotiating skills.  
Prerequisite: PSYC 107.  

PSYC 360/NRSC 360 Health Psychology and Behavioral Medicine  
Credits 3. 3 Lecture Hours.  
Health psychology emphasizing behavioral and lifestyle factors in health and illness, prevention and modification of health-compromising behaviors, health care utilization, and psychological management of chronic disorders and psychological management of chronic disorders and terminal illnesses.  
Prerequisite: PSYC 107.  
Cross Listing: NRSC 360/PSYC 360.  

PSYC 365 Psychology of Aging  
Credits 3. 3 Lecture Hours.  
Examination of the psychological aspects of the aging process including physiology and health, memory and intellectual functioning, personality and social relationships, emotional health and late life transition.  
Prerequisite: PSYC 107.  

PSYC 371 Forensic Psychology  
Credits 3. 3 Lecture Hours.  
Interface between psychology and the legal system; role of psychological theories and data, as well as mental health expertise, in the resolution of criminal trials and civil disputes; legal system's impact on the practice of psychology.  
Prerequisite: PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 407 Behavioral Disorders of Children  
Credits 3. 3 Lecture Hours.  
Behavior problems related to childhood; psychological aspects of mental retardation, emotional disturbance, physical handicaps and other disorders; causative factors, preventative and therapeutic methods explored; where feasible, practical experience included as requirement.  
Prerequisites: PSYC 306; PSYC 307 or equivalent.  

PSYC 411 Psychology of Self  
Credits 3. 3 Lecture Hours.  
Overview of psychological theory and research on issues related to the self, the self-concept and identity, and how these phenomena are integral to the human experience and to mental health and well-being.  
Prerequisite: PSYC 306 or PSYC 315 or approval of instructor.  

PSYC 414 Behavior Principles  
Credits 3. 3 Lecture Hours.  
Behavioral analysis of humans' complex interactions with their environments: how behavioral repertoires are constructed during maturation process; how existent behaviors are strengthened, weakened or eliminated; and how features of environment exercise control over behavioral components within a repertory.  
Prerequisites: 9 hours of psychology; PSYC 301 and PSYC 302 or junior or senior classification.  

PSYC 432 Diversity and Inclusion in Organizations  
Credits 3. 3 Lecture Hours.  
Psychological and organizational theory and research on the experience of diversity and inclusion in organizations.  
Prerequisites: PSYC 315, PSYC 352, PSYC 353, or approval of instructor.
PSYC 450 Clinical Psychology  
Credits 3. 3 Lecture Hours. 
Analysis of the field of clinical psychology with a particular focus on the theoretical and scientific bases for the practice of clinical psychology.  
**Prerequisites:** PSYC majors only; grade of C or better in PSYC 301, PSYC 302 and PSYC 306.

PSYC 470 Psychological Testing and Measurement  
Credits 3. 3 Lecture Hours. 
Theories and techniques of measurement of psychological concepts; a range of measurement models and procedures; critical tasks of evaluating strategies for measuring psychological concepts and drawing inferences and interpretations from commonly used psychological assessments.  
**Prerequisites:** PSYC 301; junior or senior classification or approval of instructor.

PSYC 484 Field Experiences  
Credits 0 to 6. 0 to 6 Other Hours. 
Participation in an approved mental health, mental retardation, school, industrial or other approved setting; field experiences supervised by an appropriate professor within an area of student interest; course requirements vary with the setting, the supervising professor and the needs of the individual student. May be repeated for credit.  
**Prerequisites:** PSYC 301 and PSYC 302; 12 hours of psychology; GPR of 2.5 or better in all psychology courses; major in psychology; approval of instructor.

PSYC 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours. 
Directed readings or research problems in selected areas designed to supplement existing course offerings. May be repeated for credit.  
**Prerequisites:** Approval of instructor.

PSYC 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 
Selected topics in an identified area of psychology. May be repeated for credit.  
**Prerequisites:** PSYC 107 and approval of instructor.

PSYC 491 Research  
Credits 0 to 3. 0 to 3 Other Hours. 
Research conducted under the supervision of a chosen faculty member in the department of psychology; involves discussion and presentation of student research projects. May be repeated for credit.  
**Prerequisites:** PSYC 484 or PSYC 485; approval of instructor.

RDNG 291 Research  
Credits 1 to 4. 1 to 4 Other Hours. 
Research conducted under the direction of faculty member in reading. May be repeated for credit.  
**Prerequisites:** Freshman or sophomore classification and approval of instructor.

RDNG 351 Reading in the Elementary School  
Credits 3. 3 Lecture Hours. 
Recent trends, issues, materials and procedures considered essential for effective teaching of reading, such as comprehension, word analysis, study skills, motivation, grouping, etc.  
**Prerequisites:** Concurrent enrollment in RDNG 361; junior classification or approval of department head.

RDNG 351 Assessment in Reading Instruction  
Credits 3. 3 Lecture Hours. 
Evaluation and use of commonly used achievement tests, development of criterion referenced tests and interpretation and construction of informal measures for assessing reading skills.  
**Prerequisites:** Concurrent enrollment in RDNG 351; junior classification or approval of department head.

RDNG 371 Multicultural and Interdisciplinary Literature for Middle Grades  
Credits 3. 3 Lecture Hours. 
Focuses on multicultural and interdisciplinary literature appropriate for middle grades students; implements and evaluates effective multicultural, interdisciplinary instruction through selection, use and development of literature in middle grades classroom.  
**Prerequisites:** Junior classification.  
**Corequisite:** INST 322 recommended.

RDNG 372 Reading and Writing across the Middle Grades Curriculum  
Credits 3. 3 Lecture Hours. 
Relationship between language and reading, dialect and reading, and linguistics.

RDNG 377 Reading and the Language Arts  
Credits 3. 3 Lecture Hours. 
Focuses on multicultural and interdisciplinary literature appropriate for middle grades students; implements and evaluates effective multicultural, interdisciplinary instruction through selection, use and development of literature in middle grades classroom.  
**Prerequisites:** RDNG 351, RDNG 361.

RDNG 385 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours. 
Directed readings or research problems in selected areas designed to supplement existing course offerings. May be repeated for credit.  
**Prerequisites:** Approval of instructor.

RDNG 460 Language and Reading  
Credits 3. 3 Lecture Hours. 
Relationship between language and reading, dialect and reading, and linguistics.

RDNG 461 Teaching Reading Through Children's Literature  
Credits 3. 3 Lecture Hours. 
Use of past and contemporary literature for the motivation of wide leisure reading in the elementary grades.  
**Prerequisites:** RDNG 351, RDNG 361.

RDNG 465 Reading in the Middle and Secondary Grades  
Credits 3. 3 Lecture Hours. 
Reading needs of middle and secondary school students with emphasis upon curriculum organization for reading development and assessment of student progress in content area reading.

RDNG 467 Reading and the Language Arts  
Credits 3. 2 Lecture Hours. 3 Lab Hours. 
Recent trends, issues and research on the impact of listening, oral language, process writing, grammar, spelling and handwriting on the development of reading strategies and communicative competence. Application of research in field settings.  
**Prerequisites:** RDNG 351 and RDNG 361; admission to teacher education. Must be taken concurrently with TEFB 410, TEFB 412 and TEFB 413.

RDNG 468 Essential Foundations of Language and Literacy for All Learners  
Credits 3. 3 Lecture Hours. 
Relationship among literacy, language, dialect and linguistics; role of the child, community and school through stages of literacy and second language learning; literacy instructional procedures for all learners including dyslexia.  
**Prerequisites:** RDNG 351 or RDNG 372 or SPED 412.
RDNG 470 Reading/Language Arts Methods in Middle Grades Education
Credits 3. 2 Lecture Hours. 6 Other Hours.
Investigate current trends and issues in teaching listening, oral
language, process writing, spelling, grammar and handwriting; explores
relationships among the development of various language arts and the
development of reading strategies and communicational competencies
of middle school learners; application of best instructional practices
informed by research.
Prerequisites: MEFB 352; admission to teacher education; senior
classification.
Corequisites: RDNG 490; MEFB 450.
RDNG 472 Teaching Writing in Elementary and Middle Grade Classrooms
Credits 3. 3 Lecture Hours.
Focuses on effective methods of writing instruction and assessment
for the middle grades; reviews and reinforces sound writing practices;
exposes students to theory and research in the area of writing
instruction.
Prerequisite: Junior classification.
RDNG 490 Assessment in Reading Instruction in Middle Grades
Credits 3. 2 Lecture Hours. 6 Other Hours.
Evaluation of middle grades students reading performance; selection,
understanding, and implementation of formal and informal evaluation
procedures in classroom reading assessment, diagnosis, and instruction.
Prerequisites: MEFB 352; admission to teacher education; senior
classification.
Corequisites: RDNG 470; MEFB 450.
RDNG 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member in reading.
May be repeated 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

RELS - Religious Studies (RELS)

RELS 211/HUMA 211 Hebrew Scriptures
Credits 3. 3 Lecture Hours.
Philosophical concepts of the Hebrew Scriptures as they relate to the
development of religious and ethical ideas.
Cross Listing: HUMA 211/RELS 211.
RELS 213/HUMA 213 New Testament
Credits 3. 3 Lecture Hours.
The origin and development of the religious and philosophical concepts
of the New Testament.
Cross Listing: HUMA 213/RELS 213.
RELS 220 History of Christianity: Origins to the Reformation
Credits 3. 3 Lecture Hours.
History of Christian doctrine, ecclesiastical organization, and religious
practice, origins through Reformation, with emphasis on religion and
society; life and teachings of Jesus; apostolic church; patristic period;
Christianization of Roman Empire and northern Europe; monasticism;
medieval church; Gregorian reform; heresy; papal monarchy; schism and
conciliarism; reformation of the sixteenth century.
Cross Listing: CLAS 220 and HIST 220.
RELS 221/HIST 221 History of Islam
Credits 3. 3 Lecture Hours.
Introduction to the history of Islam, from the origins of the religion to the
present; development of Islamic law; gender issues; expansion of Islam
to Sub-Saharan Africa and South Asia; globalized Islam.
Cross Listing: HIST 221/RELS 221.
RELS 251/CLAS 251 Classical Mythology
Credits 3. 3 Lecture Hours.
Introduction to the most important myths of Greeks and Romans; ancient
and modern methods of interpreting myths; the role of myths in ancient
literature; readings in English.
Cross Listing: CLAS 251/RELS 251.
RELS 257 Communication, Religion and the Arts
Credits 3. 3 Lecture Hours.
Introduction to artistic, religious communication; survey of
communication art and media art practices across religious contexts;
consideration of communication aesthetics that mediate religious
experience.
Cross Listing: COMM 257.
RELS 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Readings and/or assigned projects for specific needs of students
minoring in religious studies; directed independent or individual study in
an identified area of religious studies.
Prerequisite: Approval of coordinator of religious studies.
RELS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of religious studies. May be repeated
for credit.
Prerequisite: Approval of instructor.
RELS 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in Liberal
Arts.
Prerequisites: Freshman or sophomore classification and approval of
instructor.
RELS 302 Women and Religion
Credits 3. 3 Lecture Hours.
Investigation of women's position in religious institutions historically
and/or currently, religion's influence on women's roles and status, and
women's attempts to define their own religious perspectives; draws on
sociological and philosophical insights and methods.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: SOCI 302 and WGST 302.
RELS 303/HUMA 303 Near Eastern Religions
Credits 3. 3 Lecture Hours.
Beliefs and practices of Judaism, Zoroastrianism, Christianity, and Islam
with particular attention to their philosophical presuppositions.
Cross Listing: HUMA 303/RELS 303.
RELS 304/HUMA 304 Indian and Oriental Religions
Credits 3. 3 Lecture Hours.
Beliefs and practices of Hinduism, Jainism, Sikhism, Buddhism,
Confucianism, Taoism, and Shinto with particular attention to their
philosophical presuppositions.
Cross Listing: HUMA 304/RELS 304.
RELS 312 Contemplation in the Modern World
Credits 3. 3 Lecture Hours.
Interdisciplinary approach to examining contemplative practices:
origins in philosophy and religious traditions, goals and techniques of
contemplation, contemplation in relation to cultural and social problems
or needs.
RELS 317/ANTH 317 Introduction to Biblical Archaeology
Credits 3. 3 Lecture Hours.
Application of archaeology in biblical research; basic overview of the material cultures that are the setting for the biblical narratives.
Cross Listing: ANTH 317/RELS 317.

RELS 321 Political Islam and Jihad
Credits 3. 3 Lecture Hours.
Interaction between Islamic movements and politics in various Middle Eastern countries; the meaning and evolution of jihad; the role of Islam as a tool for political and social mobilization.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: HUMA 321 and INTS 321.

RELS 326/SOCI 326 Sociology of Religion
Credits 3. 3 Lecture Hours.
Institution of religion and religious-related behavior; relationship between dynamic and structural religion and contemporary society.
Prerequisite: SOCI 205.
Cross Listing: SOCI 326/RELS 326.

RELS 331/PHIL 331 Philosophy of Religion
Credits 3. 3 Lecture Hours.
Philosophical problems of western religion such as the existence of God, the problem of evil, types of theism, rational, empirical, and mystical approaches to God.
Cross Listing: PHIL 331/RELS 331.

RELS 340/ANTH 340 Folklore and the Supernatural
Credits 3. 3 Lecture Hours.
Traditional expressions of the supernatural such as superstition, belief tale and divination classified as folklore genres and their relationships to the cultures in which they develop; theories drawn from anthropology, folklore and related social sciences.
Prerequisite: Junior or senior classification or approval of instructor.

RELS 347/HIST 347 Rise of Islam, 600-1258
Credits 3. 3 Lecture Hours.
Introduction to Islamic civilization from the rise of Islam to the Mongol conquests; examination of pre-Islamic poetry, the Qur'an, early Islamic laws on prayer, the ethical conventions of jihad, the lives of Muslim women, and the relation of Islam to Judaism and Christianity.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 347/RELS 347.

RELS 360/ENGL 365 The Bible as Literature
Credits 3. 3 Lecture Hours.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 365/RELS 360.

RELS 365/HIST 365 Religion in Early America
Credits 3. 3 Lecture Hours.
Religion in North America from colonial beginnings to eve of Civil War; relations between European Christianity, Native Americans and African Americans; religious pluralism, reform movements, social and political change.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 365/RELS 365.

RELS 366/HIST 366 Religion in Modern America
Credits 3. 3 Lecture Hours.
Religion in America from the Civil War to contemporary period; relationship of religion and racial formation, capitalism, gender, sexuality, immigration; religious pluralism; evangelicalism; role of religious politics and social movements.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 366/RELS 366.

RELS 392/ENGL 392 Studies in Literature, Religion and Culture
Credits 3. 3 Lecture Hours.
Studies in Literature, Religion, and Culture. Exploration of literature treating significant religious topics in the context of cultural setting; features current faculty research on such topics as Tolkien and the making of myth, C.S. Lewis, texts and cultures of the Middle East and Victorian women writers and religion. May be repeated one time for credit.
Prerequisites: 3 credits of literature at 200-level or above; junior or senior classification.
Cross Listing: ENGL 392/RELS 392.

RELS 403/ANTH 403 Anthropology of Religion
Credits 3. 3 Lecture Hours.
Anthropological theories of the relationship of religious behavior to social structure and cultural change, with particular reference to non-Western, pre-industrial societies.
Cross Listing: ANTH 403/RELS 403.

RELS 405 Psychology of Religion
Credits 3. 3 Lecture Hours.
Review of world's religions and the psychological study of the religious experience; religion within the context of personality; religious development through social interactions; religion in psychological research and therapy.
Prerequisites: PSYC 306 and PSYC 330 or approval of instructor.

RELS 418 European Intellectual History from Ancient Greece to the Early Middle Ages
Credits 3. 3 Lecture Hours.
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from Pre-Socratic Greece through the formative stages of the Christian Middle Ages.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: CLAS 418 and HIST 418.

RELS 419/HIST 419 European Intellectual History from the High Middle Ages to the 17th Century
Credits 3. 3 Lecture Hours.
Political and social history of selected major figures and important movements in political theory, literature, sociology, art, economics and philosophy from the founding of Scholasticism and the University System to the New Philosophy and science of 17th century.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: HIST 419/RELS 419.

RELS 436/ANTH 436 Ancient Egypt
Credits 3. 3 Lecture Hours.
Archaeology and history of ancient Egypt from earliest times to the end of the New Kingdom period.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: ANTH 436/RELS 436.
RELS 464/PHIL 464 Modern Jewish Thought and Philosophy  
Credits 3. 3 Lecture Hours.  
An overview of modern Jewish thought and philosophy spanning Jewish European thinkers from the 18th century to the 20th century.  
Prerequisite: Junior or senior classification.  
Cross Listing: PHIL 464/RELS 464.

RELS 471/HISP 471 Hispanic Religions  
Credits 3. 3 Lecture Hours.  
Exploration of the history and practice of Hispanic religion, including spirit possession, evil eye, consumption of sacred substances, healing traditions, ex-votos, reliquaries, prophecy, omens, monsters, astrology, witchcraft, the Inquisition, festivals, pilgrimage, mystics and religious contributions of diverse ethnic groups.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: HISP 471/RELS 471.

RELS 474/HISP 474 Diversity Lessons from Medieval Spain  
Credits 3. 3 Lecture Hours.  
Crucible of cultures--Christian, Jewish, and Muslim—that was medieval Spain and modern implication of the experience in diversity.  
Prerequisites: ENGL 104 and junior or senior classification or approval of instructor.  
Cross Listing: HISP 474/RELS 474.

RELS 480/COMM 480 Religious Communication  
Credits 3. 3 Lecture Hours.  
The role of religious communication as manifested in speeches, sermons, debates, campaigns, and social movements throughout history. May be taken two times for credit.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: COMM 480/RELS 480.

RELS 485 Directed Studies  
Credits 0 to 6. 0 to 6 Other Hours.  
Readings and/or assigned projects for specific needs of students minoring in religious studies; directed independent or individual study in an identified area of religious studies.  
Prerequisite: Approval of coordinator of religious studies.

RELS 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of religious studies. May be repeated for credit.  
Prerequisite: Approval of instructor.

RELS 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of a faculty member in Liberal Arts. May be taken 3 times for credit.  
Prerequisites: Junior or senior classification and approval of instructor.

RENR-Renewable Natural Resources (RENR)

RENR 205 Fundamentals of Ecology  
Credits 3. 3 Lecture Hours.  
Principles of ecology using a holistic approach treating plants, animals and humans as one integrated whole; composition, structure, nutrient cycles and energetics of biotic communities; adaptations to environmental factors; biotic relationships; and problems of environmental quality and resource use.

RENR 215 Fundamentals of Ecology--Laboratory  
Credit 1. 3 Lab Hours.  
Sampling and estimating plant-animal populations, measuring environmental factors and recognizing and studying morphological, physiological and behavioral adaptations of plants and animals to biotic or abiotic influences.

RENR 345 Park Ecology and Management  
Credits 3. 1 Lecture Hour. 4 Lab Hours.  
Classroom and hands-on exposure to outdoor recreation resources management in a major national park facing complex challenges; interactive problem-solving to understand natural resources, management strategies and issues related to a park’s broader region; includes one intensive week in Smoky Mountains National Park. May be taken two times for credit.  
Prerequisites: Junior or senior classification; or approval of instructor.

RENR 375 Conservation of Natural Resources  
Credits 3. 3 Lecture Hours.  
Principles and philosophies associated with the development, management and use of natural resources; ecological and social implications inherent in management alternatives involving the natural environment and use of renewable natural resources.

RENR 400 Study Abroad in Natural Resources  
Credits 2 to 12. 2 to 12 Lecture Hours.  
Provides students with an opportunity to gain first-hand experience in natural resource management in foreign countries; focus on the interaction of public, communal and private land tenure systems with the ecological and human dimensions of rangeland management, wildlife conservation and nature-based tourism. May be taken two times for credit.  
Prerequisite: Junior or senior classification.

RENR 405/ESSM 351 Geographic Information Systems for Resource Management  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Geographic Information Systems (GIS) approach to solving spatial problems and managing natural resources, including the acquisition, management, manipulation, analysis, and mapping of spatial and non-spatial databases; identification of natural and relevant features from various data sources; integration of relevant technologies and data; extensive use of GIS software to solve real-world problems. Only one of the following will satisfy the requirements for a degree: ESSM 351/RENR 405, RENR 405/ESSM 351, ESSM 651, BAEN 651/ESSM 651 and RENR 651.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: ESSM 351/RENR 405.

RENR 410 Ecosystem Management  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Concepts and practices relevant to the development of landscape/regional level ecosystem management plans; an ecosystem management plan will be developed utilizing a strategic management/coordinated resources approach to establish resource goals, ecosystem resource analysis and impact evaluation, and implementation compatible with societal and individual concerns.  
Prerequisites: RENR 205, senior classification or approval of instructor.
RENR 460/RPTS 460 Nature, Values, and Protected Areas
Credits 3. 3 Lecture Hours.
Writing-intensive discussion of the ways in which protected areas reflect human values about nature; identify stakeholders in and around protected areas, exploring how interests either conflict or coincide; evaluate social, economic, cultural, and ecological trade-offs of different approaches to conservation.
Prerequisite: RPTS 307 or RPTS 316; or 9 hours of credit in natural resource courses.
Cross Listing: RPTS 460/RENR 460.

RENR 470 Environmental Impact Assessment
Credits 3. 3 Lecture Hours.
The evolution of natural resources regulatory policies and how this influences current procedures for environmental/natural resources assessment and management; demonstration of the environmental impact assessment procedures and policy issues associated with environmental impacts.
Prerequisite: Senior classification or approval of instructor.

RENR 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified field of renewable natural resources. May be repeated for credit.
Prerequisite: Approval of instructor.

RLEMRangeland Ecology & Mgmt (RLEM)

RLEM 321 Field Studies in Ecological Restoration
Credit 1. 2 Lab Hours.
Field trip course that provides examples, visits and field experiences in ecological restoration; reinforces conceptual basis for ecological restoration principles developed in RLEM 320, alternative strategies for succession management, plant materials selection, seedbed preparation, planting technologies and planning ecological restoration programs.
Prerequisites: ESSM 320 or concurrent enrollment; junior or senior classification.

RLEM 324 Application of Rangeland Management Principles
Credit 1. 2 Lab Hours.
An opportunity to experience and visualize rangeland management practices under field conditions and to develop a practical understanding of rangeland planning and principles in an integrated fashion.
Prerequisite: Junior or senior classification or approval of instructor.

RLEM 401 Plant-Herbivore Dynamics
Credits 3. 3 Lecture Hours.
Evaluates the effects of herbivory at the plant population and community levels; developmental plant morphology and plant resistance to grazing; foraging strategies of herbivores relating to landscape/plant attributes along with animal nutritional needs; manipulation of the grazing process to meet management objectives.
Prerequisite: ESSM 314.

RPTS - Rec, Park & Tourism Sci (RPTS)

RPTS 201 Foundations of Recreation, Parks and Tourism
Credits 3. 3 Lecture Hours.
(PHED 1336) Foundations of Recreation, Parks and Tourism. Analysis of the elements comprising a community, community assessment techniques and community development processes engaged by stakeholders and residents to improve living conditions; definitions and principles associated with community development.

RPTS 209 Park and Tourism Operations
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Planning, execution and supervision of field maintenance and operations.

RPTS 230 Computer Applications in Recreation, Parks and Tourism
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Fundamentals of computer use and the application of software used in careers related to park and tourism enterprises; computer use in decision making and problem solving.
Prerequisite: MATH 102.

RPTS 291 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in recreation park and tourism sciences.
Prerequisites: Freshman or sophomore classification and approval of instructor.

RPTS 300 Supervised Field Studies
Credits 3. 3 Other Hours.
Survey and application of principles of recreation and parks; selected aspects of park and recreation management in an operational setting under the supervision of an approved agency; preparation and presentation of a comprehensive analysis of a specific problem; offered on an individual basis. May be repeated for credit.
Prerequisites: RPTS 307; 12 hours of credit in recreation and parks.

RPTS 301 Leisure and Outdoor Recreation in American Culture
Credits 3. 3 Lecture Hours.
Introduction to the fundamental concepts of leisure and outdoor recreation and how they influence us as individuals, groups and society; critical factors such as self, family, lifespan, ecology, health, work patterns, communications, diversity, popular culture, and consumption are studied in relationship to past, present and future leisure patterns.

RPTS 302 Application of Tourism Principles
Credits 3. 3 Lecture Hours.
Tourism principles applied at local, regional and international levels; examination of the scale, scope and organization of the industry including marketing destinations and experiences; issues related to the economic, technological and political aspects of tourism.
Prerequisite: Junior or senior classification.

RPTS 304 Administration of Recreation Resource Agencies
Credits 3. 3 Lecture Hours.
Contemporary issues and related administrative practices associated with the provision of recreation services and settings; addresses principles associated with recreation resource agency administration; personnel and customer-related administrative issues in recreation resource agencies; concepts and principles relevant to commercial and non-profit recreation resource agencies.
Prerequisites: RPTS 201.
RPTS 307 Methods of Environmental Interpretation  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Communication processes and practices between resource managers and publics using or affected by natural, cultural and tourism resource places; principles and techniques of gathering, analyzing and disseminating information through various media, such as exhibits, presentations, publications and programs.

RPTS 308 Foundations of Community and Community Development  
Credits 3. 3 Lecture Hours.  
Analysis of the elements comprising a community, community assessment techniques and community development processes engaged by stakeholders and residents to improve living conditions; definitions and principles associated with community development.  
Prerequisite: Junior or senior classification.

RPTS 311 Planning and Implementation of Events and Programs  
Credits 3. 3 Lecture Hours.  
Planning, operations, administration and evaluation; includes creation and implementation of programs and special events with budgeting, operational and venue logistics, marketing, fund raising, hospitality training and participant satisfaction.  
Prerequisite: Junior or senior classification.

RPTS 316 Recreational Management of Wildlands  
Credits 3. 3 Lecture Hours.  
Management and recreational use of wild and wilderness areas and multiple use management areas; systems and techniques for dealing with management problems in outdoor recreation.  
Prerequisite: Junior or senior classification.

RPTS 320 Event Management and Operations I  
Credits 3. 3 Lecture Hours.  
Principles and applications for effective planning and management of events; planning, promotion, operational logistics, sponsorship and evaluation.  
Prerequisite: RPTS 311.

RPTS 321 Event Management and Operations II  
Credits 3. 3 Lecture Hours.  
Advanced principles and applications of event management, including practical knowledge relating to contracting, media, fund raising, compliance and oversight, risk management, site logistics, sponsorships and vendor management.  
Prerequisites: RPTS 311 and RPTS 320.

RPTS 331 Tourism Marketing  
Credits 3. 3 Lecture Hours.  
Application of basic tourism marketing principles and concepts in government, business, and social-cause contexts; situation analysis and operational evaluation; decision making in terms of product, place, price, and channel of distribution mixes for tourism attractions and services.  
Prerequisite: RPTS 302 and junior or senior classification.

RPTS 336 Research and Analysis in Recreation and Tourism  
Credits 3. 3 Lecture Hours.  
Examination of current tourism and recreation research emphasizing specialized research methodology, adaptive techniques and methods of research useful to the recreation and tourism professional; analysis of the methods of problems identification, formulation and solution.  
Prerequisites: RENR 201 or RPTS 230 or equivalent; STAT 201 or equivalent; all mathematics requirements satisfied.

RPTS 340 Recreation, Parks, Tourism and Diverse Populations  
Credits 3. 3 Lecture Hours.  
Review of major judicial decisions and civil rights laws on provision and distribution of leisure services in society; influence of age, disability, ethnicity, national origin, race, religion and gender on individual's preferences for particular experiences; implications of individual differences for the provision of services.  
Prerequisite: Junior or senior classification.

RPTS 360 Ecotourism: Principles and Practices  
Credits 3. 3 Lecture Hours.  
Principles and practices related to ecotourism; analyzes outcomes of ecotourism for conservation and development; ecotourism as a strategy to protect culture and the physical environment.  
Prerequisite: RPTS 302.

RPTS 370 Youth Development Organizations and Services  
Credits 3. 3 Lecture Hours.  
Changing views of adolescence and youth culture in the United States; developmental assets and principles of developing positive youth development supports, opportunities and services; mentoring and staff development for youth serving agencies; goals, program emphases, administrative methods and membership of major youth serving organizations.

RPTS 371 Understanding and Developing Effective Skills for Youth Development  
Credits 3. 3 Lecture Hours.  
Development of skills needed to effectively work with youth; issues such as youth participation, conflict resolution, youth-adult collaboration, leadership development, youth empowerment and youth voice; connection of theoretical concepts to practice.  
Prerequisites: RPTS 370 and junior or senior classification.

RPTS 380 Visitor and Resource Protection I  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Fundamental values and operations of the National Park Service; communication, leadership and conservation skills and practice needed for employment with federal park agencies; physical fitness training.  
Prerequisite: Junior or senior classification or approval of instructor.

RPTS 381 Visitor and Resource Protection II  
Credits 2. 2 Lecture Hours.  
Fundamental values and operations of the visitor and resource protection branch of the National Park Service; law enforcement, customer service, ethics and team cohesion.  
Prerequisites: RPTS 380; junior or senior classification; approval of instructor.

RPTS 382 Visitor and Resource Protection III  
Credits 3. 3 Lecture Hours.  
Advanced certifications for visitor and resource protection within the National Park Service; Wildland Fire Fighting; Basic Emergency Medical Technician. Must be taken on a satisfactory/unsatisfactory basis only.  
Prerequisites: Junior or senior classification; approval of instructor.

RPTS 401 Tourism and Recreation Enterprises  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Market and financial feasibility analysis; resource characteristics, location and market aspects of tourism and recreation enterprises; sources of funding for facility development; approaches to marketing recreation, park and tourism services; applying knowledge to case study situations.  
Prerequisites: RPTS 304 or RPTS 423 and senior classification.
RPTS 402 Park Planning and Design
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Classification of areas according to primary function, location and clientele served; basic park planning principles involving scale, circulation, function and spatial relationships; methodology for establishing planning goals, objectives and planning strategies.
Prerequisites: Junior or senior classification.

RPTS 403 Financing and Marketing Recreation, Park and Tourism Resources
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Public sources of funding for facility development and of approaches to marketing recreation, park, and tourism services; applying knowledge to case study situations.
Prerequisites: RPTS 304 or RPTS 423; senior classification.

RPTS 404/SOCI 404 Sociology of the Community
Credits 3. 3 Lecture Hours.
Organization of American communities examining the bases of community, types of communities and the changes faced by communities.
Prerequisite: SOCI 205; Junior or senior classification.
Cross Listing: SOCI 404/RPTS 404.

RPTS 408 Community Development and Supporting Institutions
Credits 3. 3 Lecture Hours.
Scope, function and mission of domestic and international organizations that support community development efforts.
Prerequisites: RPTS 308 or approval of instructor; junior or senior classification.

RPTS 411 Cruise Tourism
Credits 3. 3 Lecture Hours.
Overview of cruise tourism; management of service sectors; understanding of cultural aspects of places traveled; cruise marketing/decision making; geography of cruising; youth programming; agri-tourism; identification of issues related to the economic, technological and political aspects of cruise tourism.
Prerequisite: Junior or senior classification.

RPTS 421 Hotel and Resort Operations
Credits 3. 3 Lecture Hours.
Examination of the crucial elements involved in the successful operation of a hotel or resort and how they interrelate; analysis and application of management principles in the major departments of hotels and resorts to include rooms division, food and beverage, recreation, sales and marketing.
Prerequisite: Junior or senior classification.

RPTS 423 Tourism Management
Credits 3. 3 Lecture Hours.
Management issues and tools related to the travel and tourism industry; history, planning, operations, leading, directing and controlling tourism businesses; complexity and scope of tourism systems; issues related to ethics and sustainability; managing tourism in different environments; roles of technology and information technology; future of tourism.
Prerequisite: RPTS 302.

RPTS 426 Tourism Impacts
Credits 3. 3 Lecture Hours.
Consequences and impacts of various kinds of tourism development for host communities and regions; read and evaluate case studies from Texas, other areas in the United States and internationally; economic, environmental, social, cultural and political impacts associated with tourism proposals, project development, tourist activity, industry expansion and industry decline.
Prerequisite: RPTS 302.

RPTS 441 Tourism Experience
Credits 3. 3 Lecture Hours.
Theoretical foundation of tourism experiences from an interdisciplinary perspective, including the role of humans, nature/landscapes, built environments and technologies in staging tourism-experiences; draws implications for the design/planning, management and marketing of tourism venues such as events, festivals, museums, hotels/resorts, cruise ships, cities, theme parks, and websites.
Prerequisite: Junior or senior classification or approval of instructor.

RPTS 444 Service Quality for Hospitality Organizations
Credits 3. 3 Lecture Hours.
Application of SERVQUAL concepts with focus on implementing measures to enhance customer service; in-depth study of planning and administering hospitality service strategies, measurement of service delivery, repair and recovery of service delivery gaps, and management and training of employees; practical applications of research in the field.
Prerequisite: Junior or senior classification.

RPTS 445 Sustainability in International Tourism
Credits 3. 3 Lecture Hours.
International tourism with a focus on the diversity of tourism practices and policies around the world and approaches scholars use to study tourism planning, management, marketing, sustainability and impacts; includes a required international field trip during spring break.
Prerequisite: Junior or senior classification or approval of instructor.

RPTS 446 Information Technology Adoption and Use in Recreation, Park and Tourism Organizations
Credits 3. 3 Lecture Hours.
Theories of technology adoption and diffusion in recreation, park and tourism organizations; use of technology for knowledge management, benchmarking, and collaboration within leisure and tourism organizations.
Prerequisite: RENR 201.

RPTS 454 Amazon Field School
Credits 4. 4 Lecture Hours.
Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences and solutions to biodiversity loss through ecology, culture and governance.
Prerequisites: Junior or senior classification with a minimum GPA of 2.0 and approval of instructor.
Cross Listing: VTPB 404 and WFSC 454.
RPTS 460/REN 460 Nature, Values, and Protected Areas
Credits 3. 3 Lecture Hours.
Writing-intensive discussion of the ways in which protected areas reflect human values about nature; identify stakeholders in and around protected areas, exploring how interests either conflict or coincide; evaluate social, economic, cultural, and ecological trade-offs of different approaches to conservation.
Prerequisite: RPTS 307 or RPTS 316; or 9 hours of credit in natural resource courses.
Cross Listing: RENR 460/RPTS 460.

RPTS 474 Management of Programs and Services for Youth
Credits 3. 3 Lecture Hours.
Organizational behavior, administration and management of public, non-profit and commercial youth programs and agencies; strategic planning, marketing, financial resource development, budgeting and fiscal management; contemporary issues facing youth development field; international perspective on youth agencies.
Prerequisite: RPTS 304, RPTS 370 and RPTS 371.

RPTS 476 Leadership for Outdoor Recreation
Credits 3. 3 Lecture Hours.
Leadership principles related to outdoor recreation; classroom instruction and experiential learning; skills training through field trips; risk management planning, environmental education, group facilitation, and trip planning.
Prerequisite: RPTS 370.

RPTS 478 Youth Development Practice
Credits 3. 3 Lecture Hours.
Application of youth development philosophy in community settings; principles and practices of community youth development and existing youth development models; local efforts related to community youth development.
Prerequisite: RPTS 370, RPTS 371 and junior or senior classification.

RPTS 481 Seminar
Credit 1. 1 Lecture Hour.
Development of knowledge and skills necessary for employment in the recreation, park and tourism fields; focus on career preparation and job search strategies, professionalism, networking and opportunities for advanced education.
Prerequisite: Junior or senior classification; RPTS majors only.

RPTS 484 Internship
Credits 1 to 6. 1 to 6 Other Hours.
Practical experience working in a professional recreation, park or tourism setting. Offered on an individual basis. May be repeated for credit.
Prerequisite: RPTS 311, RPTS 340 and RPTS 481.

RPTS 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
For individual research by advanced undergraduates upon a broad range of subjects not included in established courses.
Prerequisite: Junior classification or approval of department head.

RPTS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 9 Lab Hours.
Selected topics in an identified field of recreation and parks. May be repeated for credit.

RPTS 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in recreation and tourism sciences. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

RUSS - Russian (RUSS)

RUSS 101 Beginning Russian I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(RUSS 1411) Beginning Russian I. Elementary language study with oral, written and reading practice. Attention given to background for conversation. Part of class preparation will be done in language laboratory.

RUSS 102 Beginning Russian II
Credits 4. 3 Lecture Hours. 2 Lab Hours.
(RUSS 1412) Beginning Russian II. Continuation of RUSS 101. Part of class preparation will be done in language laboratory.

RUSS 201 Intermediate Russian I
Credits 3. 3 Lecture Hours.
(RUSS 2311) Intermediate Russian I. Continuation and review of grammar, selected readings; material to develop conversational and reading ability.
Prerequisite: RUSS 101.

RUSS 202 Intermediate Russian II
Credits 3. 3 Lecture Hours.
(RUSS 2312) Intermediate Russian II. Continuation of RUSS 201. Readings taken from standard works.
Prerequisite: RUSS 201.

RUSS 211 Russian Conversation
Credits 3. 3 Lecture Hours.
Development of conversational skills in Russian; building of active vocabulary; exercises with emphasis on correct diction; oral presentations; skits; dialogues; discussion of current events; conducted in Russian.
Prerequisite: RUSS 102 or equivalent.

RUSS 221 Field Studies I
Credits 3. 3 Lecture Hours.
Russian language and culture, taught in the former Soviet Union; supervised travel of cultural interest; participation in courses and activities at a Russian university or institute; exams, written and oral reports; to be taken concurrently with RUSS 222.
Prerequisite: RUSS 102 with a grade of B or higher.

RUSS 222 Field Studies II
Credits 3. 3 Lecture Hours.
Russian language and literature taught in the former Soviet Union in cooperation with a Russian university or institute; exams, written and oral reports; to be taken concurrently with RUSS 221.
Prerequisite: RUSS 102 with a grade of B or higher.

RUSS 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects in Russian, selected for each student individually.
Prerequisite: Approval of instructor and department head.
RUSS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Russian. May be repeated for credit.
Prerequisite: Approval of instructor.

RUSS 301 Advanced Grammar and Composition I
Credits 3. 3 Lecture Hours.
Review of grammar at an advanced level; readings of literary texts for analysis and emulation; development of oral and written skills; required for modern languages majors in Russian; conducted in Russian.
Prerequisite: RUSS 202 or RUSS 222 or registration therein.

RUSS 302 Advanced Grammar and Composition II
Credits 3. 3 Lecture Hours.
Continuation of RUSS 301; literary interpretation of longer works; particular emphasis on the short stories of Chekhov and other major authors; required for modern languages majors in Russian; conducted in Russian.
Prerequisite: RUSS 202 or RUSS 222 or registration therein.

RUSS 322 Masterpieces of Russian Literature
Credits 3. 3 Lecture Hours.
Selected works of Russian literature, representative of its major authors and most important literary movements; literary analysis and evaluation of each work's cultural background; conducted in Russian.
Prerequisite: RUSS 202 or RUSS 222 or registration therein. May be retaken with approval of department head.

RUSS 410 Seminar in Russian Studies
Credits 3. 3 Lecture Hours.
Exploration of a significant topic, event, or period in Russian literature and culture; taught in Russian.
Prerequisite: RUSS 202 or RUSS 222.

RUSS 441/EURO 441 The Russian Novel I: Tolstoy and Dostoevsky
Credits 3. 3 Lecture Hours.
Study of the major works of Tolstoy and Dostoevsky; discussion of the literary nature and purpose of novels, especially in the context of Russian culture; taught in English.
Prerequisite: RUSS 201 or registration therein, or approval of instructor.
Cross Listing: EURO 441/RUSS 441.

RUSS 442/EURO 442 The Russian Novel II: The Twentieth Century
Credits 3. 3 Lecture Hours.
Study of major Russian novels from ca. 1900 to the end of Stalinism; exploration of topics relevant to Russia's experience in the 20th century; taught in English.
Prerequisite: RUSS 201 or registration therein, or approval of instructor.
Cross Listing: EURO 442/RUSS 442.

RUSS 443/EURO 443 Contemporary Russian Prose
Credits 3. 3 Lecture Hours.
Study of Russian and Soviet 20th century prose literature, with emphasis on post-Stalinist and post-glasnost writers; taught in English.
Prerequisite: RUSS 201 or registration therein, or approval of instructor.
Cross Listing: EURO 443/RUSS 443.

RUSS 444/EURO 444 Russian Drama
Credits 3. 3 Lecture Hours.
Introduction to the masterpiece of Russian drama from the 19th century to the present; includes such authors as Pushkin, Chekhov, Gorky, Arbuzov, Rozov and Petrushevskaya; taught in English.
Prerequisite: RUSS 201 or registration therein, or approval of instructor.
Cross Listing: EURO 444/RUSS 444.

RUSS 446/EURO 446 Russian Artistic Culture I: Beginnings to 1900
Credits 3. 3 Lecture Hours.
Masterpieces of Russian art, including architecture, dance, theater, music, and literature, from its beginnings until ca. 1900; taught in English.
Prerequisite: RUSS 201 or registration therein, or approval of instructor.
Cross Listing: EURO 446/RUSS 446.

RUSS 447/EURO 447 Russian Artistic Culture II: 1890 to Present
Credits 3. 3 Lecture Hours.
Masterpieces of Russian art, including architecture, dance, theater, music, and literature, from ca. 1890 to the present; taught in English.
Prerequisite: RUSS 201 or registration therein, or approval of instructor.
Cross Listing: EURO 447/RUSS 447.

RUSS 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Individual supervision of readings or assigned projects, selected for each student individually; written and oral reports.
Prerequisite: Approval of instructor and department head.

RUSS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of Russian language, literature and civilization.
Prerequisite: Approval of instructor.

RUSS 491 Research
Credits 1 to 3. 1 to 3 Other Hours.
Research conducted under the direction of faculty member in Russian. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of department head.

SCEN - College of Science (SCEN)

SCEN 201 Self-Directed Experiences with Adolescents
Credit 1. 1 Lecture Hour. 3 Lab Hours.
Study of adolescents in diverse school and community settings; issues in physical, mental, social and emotional development; issues related to racism, sexism, and cultural diversity; development, presentation, and defense of portfolio required. Attendance at all seminars and scheduled observations required.
Prerequisite: Major in mathematics, biology, chemistry or physics, or approval of instructor.

SCEN 289 Special Topics in...
Credits 0 to 3. 0 to 3 Lecture Hours. 0 to 3 Lab Hours.
Selected topics in an identified area of science. May be repeated for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

SCEN 292 Cooperative Education in Science
Credits 0 to 2. 0 to 2 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be required.
Prerequisite: Approval of the college coordinator of cooperative education.

SCEN 301 College of Science Study Abroad
Credits 0 to 18. 0 to 18 Other Hours.
For student in approved programs abroad. May be repeated for credit.
Prerequisites: Admission to approved program and approval of academic dean.
SCEN 392 Cooperative Education in Science
Credits 2. 20 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be required.
Prerequisite: Approval of the college coordinator of cooperative education.

SCEN 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 8 Lab Hours.
Selected topics in an identified area of science. May be repeated for credit.
Prerequisites: Junior or senior classification and approval of instructor.

SCEN 492 Cooperative Education in Science
Credits 0 to 2. 0 to 2 Other Hours.
Educational work assignment by a student in the field of his or her career interest and course of study. Supervision of the student will be by the cooperating employer and the instructor. A technical report, approved by the instructor, on a related subject area will be required.
Prerequisite: Approval of the college coordinator of cooperative education.

SCMT - Supply Chain Mgmt (SCMT)

SCMT 300/ISYS 300 Business Communications I
Credit 1. 1 Lecture Hour.
Proper techniques for writing major-specific business communications; progress report, memorandum, letter, executive summary; verbal communications via phone call and person-to-person communications; critiques of personal and peer writing.
Prerequisites: Junior or senior classification; SCMT majors only.
Cross Listing: ISYS 300/SCMT 300.

SCMT 303 Statistical Methods
Credits 3. 3 Lecture Hours.
Collection, tabulation and presentation of numerical data; sampling, estimation of averages and variation, probability and error, hypothesis testing and correlation.
Prerequisite: Admission to upper division in Mays Business School.

SCMT 305 Intermediate Business Statistics
Credits 3. 3 Lecture Hours.
Selected topics in statistical analysis; practical applications to functional problems in accounting, finance, marketing and management; applications of existing computer programs minimize computations.
Prerequisite: SCMT 303 or STAT 301, STAT 302, or STAT 303.

SCMT 309 Supply Chain Management Principles
Credits 3. 3 Lecture Hours.
Integrated management of the make, buy and delivery processes in firms; emphasis on issues specific to the procurement, manufacturing, and logistics disciplines; requirements for operating in a global marketplace; includes cultural, functional and strategic aspects of global business.
Prerequisite: ISTM 209; junior classification; University Studies Business Concentration students only.

SCMT 335 Sourcing and Procurement
Credits 3. 3 Lecture Hours.
Processes to identify and manage suppliers for goods and services to support operations; including sourcing, contracting, negotiations, buying procedures, cost and price analysis, vendor relations, auditing and inspection, supplier relations, and applications to information technology systems.
Prerequisite: SCMT 364 with a grade of C or better; SCMT 340 and SCMT 361; or approval of instructor.

SCMT 336 Decision Support Systems
Credits 3. 3 Lecture Hours.
Application of quantitative decision-making techniques to management decision problems; focus on model development, solution and implementation of results.
Prerequisites: SCMT 364; junior or senior classification.

SCMT 340 Global Supply Chain Management
Credits 3. 3 Lecture Hours.
Extend knowledge of basic concepts of transportation and logistics to specialized situations in international business in order to understand (a) the international trade and commercial environment, (b) exporting and importing documentation and procedures and (c) operations involving international shipping and transportation.
Prerequisite: SCMT 364 with a grade of C or better.

SCMT 345 Business Process Design
Credits 3. 3 Lecture Hours.
Design, implementation and improvement of the processes by which a firm sources, makes, and delivers products and services to meet customer requirements; includes six-sigma, process flow charting, computer simulation, and other techniques to document, analyze, design and improve business processes.
Prerequisite: SCMT 364 with a grade of C or better; SCMT 340 and SCMT 361; or approval of instructor.

SCMT 361 Operations Planning and Control
Credits 3. 3 Lecture Hours.
Planning and controlling the conversion of materials, labor, capital, and information into goods and services for both manufacturing and service organizations; emphasis on managerial and technical aspects of planning and controlling operating systems.
Prerequisite: SCMT 364 with a grade of C or better; or approval of instructor.

SCMT 364 Operations Management
Credits 3. 3 Lecture Hours.
Concepts, issues and techniques used to plan, analyze, and control systems of production; operational problems in producing goods and services.
Prerequisite: SCMT 303 or STAT 301, STAT 302, or STAT 303 or concurrent enrollment; admission to upper division in Mays Business School.

SCMT 370/ISTM 370 Introduction to Energy Industry
Credits 3. 3 Lecture Hours.
History of the modern Oil & Gas Industry; ecosystem of companies driving the industry; operations involved in exploration, production, refining, trading, pipeline, and retail in bringing oil to market; accounting and economics of the industry; issues and solutions in supporting supply chain; discussion of technology innovations occurring in the industry.
Prerequisite: Admission to upper division in Mays Business School.
Cross Listing: ISTM 370/SCMT 370.
SCMT 375 Supply Chain Security  
Credits 3. 3 Lecture Hours.  
Security of global supply chains; selection of appropriate technologies utilized in securing global supply chains; planning responses to disaster events in relation to the delivery and receipt of goods and services; designing draft security policies for an organization’s supply chain.  
Prerequisite: SCMT 364.

SCMT 380 Lean Business Systems  
Credits 3. 3 Lecture Hours.  
Analysis of real world business challenges using an operational framework to identify and solve problems; provides a route map to sustain results; exploration of lean strategies such as root cause analysis, batch to pull processes, value stream mapping, level loading, line balancing.  
Prerequisite: Admission to upper division in Mays Business School.

SCMT 381 Lean Business Tools and Techniques  
Credits 3. 3 Lecture Hours.  
In-depth and hands-on look into specific Lean tools used to solve specific tactical problems; standard work strategies, time studies, waste simulation, PFEPS, productive maintenance, visual daily management systems, and Kaizen events.  
Prerequisite: Admission to upper-division in Mays Business School.

SCMT 400/ISYS 400 Business Communication II  
Credit 1. 1 Lecture Hour.  
Development of critical interpersonal and oral communication skills; strategies for positive team development; conflict resolution; oral presentations and information elicitation; production of effective visual aids.  
Prerequisites: Junior or senior classification; SCMT majors only.  
Cross Listing: ISYS 400/SCMT 400.

SCMT 464 Advanced Supply Chain Management  
Credits 3. 3 Lecture Hours.  
Advanced contemporary topics in supply chain and operations management; developing analytical insights into the operation of selected methodologies.  
Prerequisites: SCMT 340 and senior classification.

SCMT 465 Information Technology for Supply Chain Management  
Credits 3. 3 Lecture Hours.  
Overview of information technology applications for planning and controlling the design, manufacture and distribution of goods and services; managerial and technical aspects of information technology for product design, shop floor, factory, enterprise and supply chain management.  
Prerequisite: SCMT 340 with a grade of C or better; SCMT 361; or approval of instructor.

SCMT 468 Enterprise Resource Planning  
Credits 3. 3 Lecture Hours.  
Application of advanced information technology for integrating business functions through distributed databases; applications for planning, scheduling, purchasing and costing to multiple layers of the organization.  
Prerequisite: SCMT 364.

SCMT 484 Supply Chain Management Internship  
Credits 1 to 4. 1 to 4 Other Hours.  
A directed internship in an organization to provide students with a learning experience supervised by professionals in organizational settings appropriate to the student’s professional objectives. Must be taken on a satisfactory/unsatisfactory basis.  
Prerequisite: SCMT major and approval of academic advisor and instructor.

SCMT 485 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Directed study of selected problems in an area of supply chain management not covered in other courses.  
Prerequisites: Admission to upper division in Mays Business School and approval of academic advisor and instructor.

SCMT 489 Special Topics In...  
Credits 1 to 4. 1 to 4 Other Hours.  
Selected topic in an identified field of supply chain management two times for credit.  
Prerequisites: Admission to upper division in Mays Business School and approval of academic advisor and instructor.

SCSC - Soil and Crop Sciences (SCSC)

SCSC 105 World Food and Fiber Crops  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
(AGRI 1307 and AGRI 1107, AGRI 1407) World Food and Fiber Crops.  
Plant relationships, structure and development; environmental factors affecting plants; technological aspects of agricultural practices; food production for an increasing population.

SCSC 201 Great Plains Settlement and Farming  
Credits 3. 3 Lecture Hours.  
American Indian hunting and farming; transformation by Manifest destiny, Homestead Act, railroads, Indian Wars, U.S. Army, crops and farm families; effects of World Wars, Great Depression, Dust Bowl, irrigation, fertilization, pest controls, precision farming.

SCSC 205 Problem Solving in Plant and Soil Systems  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Problems in management of soils, crops, and natural resources; problem solving skills including collecting, interpreting, using and communicating scientific and nonscientific data.

SCSC 207 World Food and Fiber Crops II  
Credits 3. 3 Lecture Hours. 2 Lab Hours.  
Plant relationships, structure and development; environmental factors affecting plants; technological aspects of agricultural practices; food production for an increasing population.

SCSC 208 Great Plains Settlement and Farming II  
Credits 3. 3 Lecture Hours. 2 Lab Hours.  
American Indian hunting and farming; transformation by Manifest destiny, Homestead Act, railroads, Indian Wars, U.S. Army, crops and farm families; effects of World Wars, Great Depression, Dust Bowl, irrigation, fertilization, pest controls, precision farming.

SCSC 289 Special Topics In...  
Credits 0 to 4. 0 to 4 Other Hours.  
Selected topics in an identified area of soil and crop sciences. May be repeated for credit.

SCSC 291 Research  
Credits 1 to 3. 1 to 3 Lecture Hours.  
Research conducted under the direction of faculty member in agronomy. May be repeated 2 times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

SCSC 301 Soil Science  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Evaluation of the nature and properties of soils; explanation of the various soils, their components and roles in the environment using the scientific methods and technology.  
Prerequisite: Junior or senior classification, or approval of instructor.

SCSC 302 Recreational Turf  
Credits 3. 3 Lecture Hours.  
Principles underlying construction and maintenance practices for turf facilities including athletic fields, golf courses, parks and home lawns; aesthetic, safety and economic aspects of turf varieties, soil conditions, plant protectants and maintenance equipment.  
Prerequisite: Biology or approval of instructor.
SCSC 304 Plant Breeding and Genetics  
Credits 3. 3 Lecture Hours. 0 Lab Hours.  
Genetic improvement of crops by hybridization and selection; special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated and asexually reproduced plants.  
**Prerequisite:** SCSC 105 or approval of instructor.

SCSC 305 Professional Development in Agronomy  
Credit 1. 2 Lab Hours.  
Enhancement of human relation skills related to a career in soil and crop sciences; field trip to Mississippi to interact with leadership from a global agricultural company; on-campus experiences to improve effective learning practices, job seeking and retention and setting and achieving near-term and long-term professional goals.  
**Prerequisites:** Junior or senior classification or approval of instructor.

SCSC 307 Crop Biology and Physiology  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Emphasis on seed biology, germination, development of cells and tissues, anatomy, and growth and development of crop plants; plant hormones and tropisms, membranes and membrane transport, water absorption and transport through plants, photosynthesis, respiration and carbohydrate metabolism, and flowering; environmental effects on crop adaptation, growth, development, and productivity.  
**Prerequisites:** SCSC 205, junior or senior classification, or approval of instructor.

SCSC 309 Water in Soils and Plants  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Fundamentals of plant water use, and water movement and storage in soils; evapotranspiration, plant water requirements and irrigation scheduling; issues impacting irrigation and water quality; techniques for measuring soil and plant water relations.  
**Prerequisite:** Junior or senior classification, or approval of instructor.

SCSC 310 Soil Morphology and Interpretations  
Credits 2. 1 Lecture Hour. 3 Lab Hours.  
Field study of morphological features of soil profiles and the morphological characterization of important soils of Texas in relation to soil use and management.  
**Prerequisite:** SCSC 301 or registration therein.

SCSC 311 Principles of Crop Production  
Credits 3. 3 Lecture Hours.  
Review of plant physiology and crop adaptation to mesoclimates; crop management factors of planting, pest control, plant nutrition, irrigation, GIS, and harvesting techniques; special units on organic farming, conservation agriculture, farming in low-rainfall climates, and bioenergy crops; influence of markets, government policies, and the global economy on cropping strategies.  
**Prerequisites:** SCSC 307, junior or senior classification, or approval of instructor.

SCSC 312 Professional Development in Turfgrass  
Credit 1. 1 Lab Hour.  
Includes but not limited to fertilizer, pesticide, irrigation calculations; turfgrass, insect and weed identification and management, soils and rootzone construction; irrigation system operation and auditing; sprayer and spreader operation and calibration; builds upon and allows application of information obtained in SCSC 302; designed to better prepare those intending to compete in the GCSAA and STMA Collegiate Turf Bowl competitions.  
**Prerequisite:** SCSC 302 or registration therein.

SCSC 330 Social and Ethical Aspects of International Cropping Systems  
Credits 3. 3 Lecture Hours. 0 Lab Hours.  
Philosophical basis of ethical decisions; includes slavery, war, population growth, migration, farm workers, chemical inputs, genetically modified organisms, soil and water conservation and protection of wild species.  
**Prerequisite:** Junior or senior classification.

SCSC 401/FIVS 401 Forensic Soil Science  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Examination of soils biology, chemistry and physical attributes to solve crimes; soil and geologic characteristics associated with crime scene examination; physical, biological and chemical characteristics and use of trace evidence.  
**Prerequisites:** Junior or senior classification or approval of instructor.  
**Cross Listing:** FIVS 401/SCSC 401.

SCSC 402 Crop Stress Management  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Identification, measurement, biology, physiology and management of crop stress; limitations of specific environments to crop productivity; morphological and physiological crop stress response mechanisms.  
**Prerequisites:** SCSC 307, junior or senior classification, or approval of instructor.

SCSC 405 Soil and Water Microbiology  
Credits 3. 3 Lecture Hours.  
Roles of soil and water microorganisms in the sustainability and productivity of various ecosystems with specific emphasis on plant-microbial interactions, nutrient cycling, degradation of pesticides and other xenobiotics, generation of trace gases, and soil and water quality; hands-on laboratory experience with current techniques in soil and water microbiology.  
**Prerequisites:** Junior or senior classification, or approval of instructor.

SCSC 406 Soil and Water Microbiology Laboratory  
Credit 1. 2 Lab Hours.  
Hands-on experience with current techniques for examining the types, numbers, activity and roles of soil and water microorganisms with specific application to the carbon, nitrogen and sulfur cycle; plant-microbial interactions; soil and water quality.  
**Prerequisites:** SCSC 405 or concurrent enrollment; junior or senior classification or approval of instructor.

SCSC 410 International Agricultural Systems  
Credits 3. 3 Lecture Hours.  
Contrast modern agriculture systems with those in developing countries; emphasis on natural resources and technologies interacting with economic and social development on a global scale.  
**Prerequisite:** Junior or senior classification, or approval of instructor.

SCSC 411 Biotechnology for Crop Improvement  
Credits 3. 3 Lecture Hours.  
Use of biotechnology to improve agricultural, horticultural and forest crops; techniques and methods used and case studies where biotechnology has been used to alter traits such as pathogen resistance, protein or oil consumption, ripening, fertility and wood properties.  
**Prerequisite:** BIOL 111 or equivalent.  
**Cross Listing:** MEPS 411/GENE 411 and GENE 411/MEPS 411.
SCSC 420 Brazilian Agriculture and Food Production Systems
Credits 3 to 6. 3 to 6 Lecture Hours.
Comparison and study of Brazilian and U.S. agriculture and culture related to soil, water, and forest conservation and management in Brazil; tour and learn about Amazon River, rain forest, Brasilia, farm, ranch, and floral production systems, agricultural cooperatives and research, sugar and alcohol production, phosphate mining and production; visit points of interest.
Prerequisite: Junior or senior classification or approval of instructor.

SCSC 421 International Agricultural Research Centers - Mexico
Credits 3. 3 Lecture Hours.
International agricultural research; CIMMYT interaction; modern and underdeveloped tropical agricultural systems; introduction to Mexican culture; critical evaluation of complex and international agricultural issues and research programs.
Prerequisites: Junior or senior classification and approval of instructor.

SCSC 422 Soil Fertility and Plant Nutrient Management
Credits 3. 3 Lecture Hours.
Chemical and biological reactions in soils that influence nutrient availability to plants; environmental aspects associated with nutrient availability and fertilization, especially for nitrogen (N) and phosphorus (P).
Prerequisites: SCSC 301, junior or senior classification, or approval of instructor.

SCSC 423 Natural Resources and Agricultural Sustainability in UK
Credits 3. 3 Lecture Hours.
Environmental impacts and sustainability of United Kingdom and U.S. agriculture compared; soil, water, crop, and environmental management; conservation of watersheds; production of hydropower; sustainable use of water resources; cultural immersion.
Prerequisites: Junior or senior classification and approval of instructor.

SCSC 427 Sports Field Construction
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Development of knowledge, skills, and experiences for the design and construction of a turfgrass-based sports field; case studies and visits to model fields, guest lectures from sports field owners, designers, and construction company managers; hands-on construction of a small-scale sand-based sports field.
Prerequisites: SCSC 309, junior or senior classification, or approval of instructor.

SCSC 428 Advanced Turf Ecology and Physiology
Credits 3. 3 Lecture Hours.
Examination of how environmental stresses, genetics, and cultural management practices influence the growth, development, and physiology of turfgrasses; exploration of how turf communities function within urban landscapes; introduction to environmental, social, and political issues encountered when managing these areas.

SCSC 429 Turf Management Systems
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Development of turf management plans for large turfgrass sites including parks, golf courses and sports facilities; use of case studies to critically analyze turf management programs.
Prerequisite: SCSC 428.

SCSC 430 Turfgrass Maintenance
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Activities in a day-to-day turfgrass maintenance operation; decision-making in culture, equipment, irrigation systems, budgets, records and labor management. Laboratory includes principles and actual mechanical procedures involved in maintaining turfgrass.
Prerequisite: SCSC 428 or approval of instructor.

SCSC 432 Soil Fertility and Plant Nutrient Management Laboratory
Credit 1. 3 Lab Hours.
Methods used in soil testing, fertilizer recommendations, chemical and physical properties of soils, and determination of specific characteristics of a collected and analyzed soil sample.
Prerequisites: SCSC 301; SCSC 422 or registration therein, junior or senior classification, or approval of instructor.

SCSC 441 Crop Production Systems
Credits 3. 3 Lecture Hours.
Integration of crop production and management concepts through a systems approach; application of concepts using case studies and team projects.
Prerequisite: Senior classification or approval of instructor.

SCSC 444 Forage Ecology and Management
Credits 3. 3 Lecture Hours.
Investigation of multidisciplinary approaches toward the development of integrated forage, livestock, and wildlife production systems that are economically feasible and environmentally sustainable.
Prerequisite: Junior or senior classification or approval of instructor.

SCSC 446 Weed Management and Ecology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Practical information related to weed management and ecology for various vegetative systems to include turf and agronomic crops; calibration of applicators, herbicide labels, mode of action of herbicides, herbicide-resistant weed management.
Prerequisites: BIOL 111 or 101, junior or senior classification.

SCSC 452 Chemical Weed Control Laboratory
Credit 1. 0 Lecture Hours. 2 Lab Hours.
Important weed problems in Texas; herbicides and equipment used for herbicidal application.
Prerequisite: SCSC 450 or registration therein.

SCSC 453 Essentials for Weed Systematic Identification and Management in Agronomy
Credits 3. 3 Lecture Hours.
Fundamental understanding and hands-on training on the basics of plant weed identification and management; relevant to agronomy, turf, horticulture and rangeland science and vegetation identification and management.
Prerequisite: Junior or senior classification.

SCSC 455 Environmental Soil and Water Science
Credits 3. 3 Lecture Hours.
Discussion of physical, chemical, and biological properties of soil and water and the impact on productivity and sustainability of various ecosystems; application of the knowledge of properties and soil processes to develop and evaluate strategies for protecting and/or improving soil and water quality.
Prerequisite: SCSC 301 or approval of instructor.
SCSC 458 Watershed and Water Quality Management
Credits 3. 3 Lecture Hours.
Land use impact on surface and ground water chemistry; legislation impacting water quality; surface and groundwater impairment and restoration.
Prerequisite: CHEM 101 or equivalent or approval of instructor; junior or senior classification.

SCSC 481 Senior Seminar
Credits 2. 2 Lecture Hours.
Capstone course bringing together student experiences, exams, and exercises necessary for completing and assessing curriculum program learning outcomes.
Prerequisite: Senior classification.

SCSC 484 Internship
Credits 0 to 4. 0 to 4 Other Hours.
Practical on-the-job experience in the student’s area of specialization.
Prerequisites: Junior or senior classification; approval of instructor; 2.0 or better GPR in major and overall.

SCSC 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
For advanced undergraduates to permit field or laboratory investigation or study of subject matter not included in established courses.
Prerequisite: 10 hours of junior and senior agronomy or approval of instructor.

SCSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of agronomy. May be repeated for credit.
Prerequisite: Approval of department head.

SCSC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in agronomy. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification and approval of instructor.

SEFB - Special Ed Field Based (SEFB)

SEFB 420 Education and Employment Issues in Secondary Special Education
Credits 3. 2 Lecture Hours. 3 Other Hours.
Field-based course involving psychological, social, physical and cognitive development of secondary-age students; career assessment; programmatic options within educational and employment settings; transition models from school to adult settings.
Prerequisites: Admission to professional phase of program.

SEFB 425 Student Teaching in Special Education
Credits 6. 24 Other Hours.
Observation and participation in an accredited special education classroom; techniques of teaching special education and appropriate instructional strategies for students with exceptionalities. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Admission to professional phase of program and to student teaching.

SEFB 430 Practicum in Applied Behavior Analysis
Credits 3. 9 Other Hours.
University-supervised experience related to specializations in special education and behavior analysis. May be taken 8 times for credit.
Prerequisites: Junior or senior classification; approval of instructor; approval of department head.

SEFB 431 Intensive Practicum in Applied Behavior Analysis
Credits 3. 9 Other Hours.
University-supervised intensive experience related to specializations in special education and behavior analysis. May be taken 8 times for credit.
Prerequisites: Junior or senior classification; approval of instructor; approval of department head.

SEFB 499
Credits 15. 15 Lecture Hours.

SENG - Safety Engineering (SENG)

SENG 309/NUEN 309 Radiological Safety
Credits 3. 3 Lecture Hours.
Interactions of nuclear radiations with matter and biological systems; theory and practice of radiation dosimetry as applied to radiation protection; design and application of radiation dosimetry systems for personnel monitoring, area radiation monitoring and accident situation; includes external and internal dosimetry as well as long-term risk analysis.
Prerequisite: NUEN 302.
Cross Listing: NUEN 309/SENG 309.

SENG 310 Industrial Hygiene Engineering
Credits 3. 3 Lecture Hours.
Application of scientific and engineering principles in the selection and design of control systems related to chemical, physical and ergonomic exposures in the process and manufacturing industries; relationships of criteria, analysis and specifications for the assessment and control of occupational related illnesses.
Prerequisites: CHEM 107; MATH 308; PHYS 208; or approval of instructor.

SENG 312 System Safety Engineering
Credits 3. 3 Lecture Hours.
Application of system safety analytical techniques to the design process; emphasis on the management of a system safety or product safety program; relationship with other disciplines such as reliability, maintainability, human factors and product liability applications.
Prerequisite: Junior classification.

SENG 321 Industrial Safety Engineering
Credits 3. 3 Lecture Hours.
Concepts of designing, operating and maintaining optimally safe systems, risk management, economic impact, legislation, performance measurement and accident investigation/analysis; principles and practices in industrial hygiene engineering, fire protection engineering and introduction to systems safety engineering.
Prerequisite: Junior classification.

SENG 422 Fire Protection Engineering - Facilities Design
Credits 3. 3 Lecture Hours.
Design of facilities from a fire protection engineering viewpoint including fire detection and fire control systems; materials, equipment, exposures, occupancies and processes; both public and industrial occupancies studied to determine fire protection design specifications.
Prerequisite: SENG 322 or approval of instructor.
SENG 430/CHEN 430 Risk Analysis in Safety Engineering
Credits 3. 3 Lecture Hours.
Concepts of risk and risk assessment, which uses all available information to provide a foundation for risk-informed and cost-effective engineering practices; examples and exercises are drawn from a variety of engineering areas.
Prerequisite: Junior or senior classification.
Cross Listing: CHEN 430/SENG 430.

SENG 455/CHEN 455 Process Safety Engineering
Credits 3. 3 Lecture Hours.
Applications of engineering principles to process safety and hazards analysis, mitigation, and prevention, with special emphasis on the chemical process industries; includes source modeling for leakage rates, dispersion, analysis, relief valve sizing, fire and explosion damage analysis, hazards identification, risk analysis, accident investigations.
Prerequisite: Senior classification in any engineering major.
Cross Listing: CHEN 455/SENG 455.

SENG 460/CHEN 460 Quantitative Risk Analysis in Safety Engineering
Credits 3. 3 Lecture Hours.
Fundamental concepts, techniques, and applications of risk analysis and risk-informed decision making for engineering students; practical uses of probabilistic methods are demonstrated in exercises and case studies from diverse engineering areas.
Prerequisite: Senior or graduate classification.
Cross Listing: CHEN 460/SENG 460.

SENG 477 Air Pollution Engineering
Credits 3. 3 Lecture Hours.
Design of air pollution abatement equipment and systems to include cyclones, bag filters and scrubbers; air pollution regulations; permitting; dispersion modeling; National Ambient Air Quality Standards.
Prerequisite: ENGR 214 or equivalent.
Cross Listing: BAEN 477 and MEEN 477.

SENG 485 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Permits students to develop special projects in industrial hygiene engineering, safety engineering or fire protection engineering. Project must be approved by department head.

SENG 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in industrial hygiene engineering, safety engineering or fire protection engineering of specific student interest. May be repeated for credit.
Prerequisite: Approval of instructor.

SOCI - Sociology (SOCI)

SOCI 203 U.S.-Mexico Border
Credits 3. 3 Lecture Hours.
Understanding of the U.S.-Mexico border from different theoretical perspectives, including structural violence, identity, power and demography.

SOCI 205 Introduction to Sociology
Credits 3. 3 Lecture Hours.
(SOCI 1301) Introduction to Sociology. Sociological perspectives including concepts and methods; social class and social status, the family, minorities, crime, religion, power, urbanization and population.

SOCI 206 Global Social Trends
Credits 3. 3 Lecture Hours.
Long-term trends in world societies from ancient times to the present and to the foreseeable future; emphasis on contemporary international issues and problems, techniques of analysis and future projections.

SOCI 207/WGST 207 Introduction to Gender and Society
Credits 3. 3 Lecture Hours.
Similarities and differences between females and males in a number of cultures throughout the world; sociological analysis of gender in relation to social structure.
Cross Listing: WGST 207/SOCI 207.

SOCI 208 Introduction to Aging and Society
Credits 3. 3 Lecture Hours.
Introduction to a multidisciplinary approach to the social study of aging; separating facts from stereotypes about aging, examining basic sociological, psychological, and physiological factors affecting the aging process, and exploring institutions and careers related to aging.

SOCI 210 Sociology of Technology and Science
Credits 3. 3 Lecture Hours.
Examination of technology and science from a variety of theoretical perspectives; process by which engineered products are influenced by social factors as well as how they in turn, impact society; exploration and critique of classic and contemporary theories of technological development.

SOCI 211 Sociology of Deviance
Credits 3. 3 Lecture Hours.
Perspectives on non-normative behavior; theories of deviance.

SOCI 212 Sociology of Popular Culture
Credits 3. 3 Lecture Hours.
Examination of the classic and contemporary social scientific definitions and theories of culture, and popular versus “high” or elite culture(s), various forms and arenas of popular culture, such as television, film, and music, institutions and popular culture, identity (race, class, gender and sexuality) and popular culture.

SOCI 217 Introduction to Race and Ethnicity
Credits 3. 3 Lecture Hours.
Introduction to the sociological examination of race and ethnicity in U.S. society; overview of theories and methods in the study of race and ethnicity, an understanding of how they function as individual and group-level identities, and organizing principles in social institutions.

SOCI 220 Methods of Social Research
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Relationships between sociological theory, research, qualitative evaluation of data; construction and use of analytical procedures and research techniques, and participant observation.

SOCI 229 Qualitative Methods
Credits 3. 3 Lecture Hours.
Methodologies in social research with emphasis on qualitative dimensions of inquiry; topics include in-depth interviewing, observation, unobtrusive measures, analysis of documents, fieldwork issues, ethics, note-taking, preliminary data analysis, and an overview of writing research reports based on qualitative research.

SOCI 230 Classical Sociological Theory
Credits 3. 3 Lecture Hours.
Role of theory in sociological study; the development of classical theoretical perspectives providing the foundation for contemporary theory.
SOCI 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Special problems not covered by other courses. Course depends upon needs and interest of the student and upon the number of credit hours.
Prerequisite: Sophomore classification in sociology.

SOCI 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of sociology. May be repeated for credit.
Prerequisite: Approval of instructor.

SOCI 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a chosen faculty member in sociology. May be taken for a maximum of three hours total credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

SOCI 302 Women and Religion
Credits 3. 3 Lecture Hours.
Investigation of women’s position in religious institutions historically and/or currently, religion’s influence on women’s roles and status, and women’s attempts to define their own religious perspectives; draws on sociological and philosophical insights and methods.
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 304 Criminology
Credits 3. 3 Lecture Hours.
Criminal law and crime rates; explanations of criminal behavior; criminal careers, police, adult courts and prisons.
Prerequisite: Junior classification.

SOCI 306/ASIA 306 Society and Population of Modern China
Credits 3. 3 Lecture Hours.
Major trends and current topics in social and demographic aspects of the society of modern China, including Taiwan.
Prerequisite: Junior or senior classification.

Cross Listing: ASIA 306 and WGST 302.

SOCI 308 Community Issues in Aging
Credits 3. 3 Lecture Hours.
Detailed exploration of social forces impacting the elderly and their families at the community level; the impact of demographic, cultural, organizational and social factors on a community’s response to an increasingly aging population; and the application of this knowledge through volunteer collaboration with a community nonprofit organization serving the elderly.
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 310/WGST 310 Motherhood in Society
Credits 3. 3 Lecture Hours.
Examines expectations and/or practices relating to motherhood, with consideration of their cultural impact; taught from a social science perspective.
Prerequisites: Junior or senior classification or approval of instructor.
Cross Listing: WGST 310/SOCI 310.

SOCI 311 Social Change
Credits 3. 3 Lecture Hours.
Survey of major changes in American and Western society, the forces underlying change and tensions caused by social change.
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 312 Population and Society
Credits 3. 3 Lecture Hours.
The causes and implications of major population trends.

SOCI 313 Military, War and Society
Credits 3. 3 Lecture Hours.
Major trends and current topics in military organization; the experience and conduct of war; civil-military relations.

SOCI 314 Social Problems
Credits 3. 3 Lecture Hours.
Survey and exploration of causes and consequences of major social problems in American society such as poverty, unemployment, energy, alcohol, other drugs and sexual abuse.

SOCI 315/WGST 315 The Marriage Institution
Credits 3. 3 Lecture Hours.
Courtship, engagement, marriage, family formation, personal adjustment, conflict, financing and child rearing.
Cross Listing: WGST 315/SOCI 315.

SOCI 316/WGST 316 Sociology of Gender
Credits 3. 3 Lecture Hours.
Sociological explanations of status differences between men and women; cross-cultural comparisons; gender role socialization, cultural stereotypes, discrimination; gender roles and status in the family, economy, religion, science, other social institutions; deviance, victimization and gender; recent social changes.
Cross Listing: WGST 316/SOCI 316.

SOCI 317/AFST 317 Racial and Ethnic Relations
Credits 3. 3 Lecture Hours.
Status of racial and ethnic groups such as Native Americans, African Americans, Latino Americans, Asian Americans, European Americans, and other groups in the political, economic, legal and social systems of the United States.
Cross Listing: AFST 317/SOCI 317.

SOCI 319/SPMT 319 Sociology of Sport
Credits 3. 3 Lecture Hours.
Social institution of sport and its consequences for American society social organization from play to professional sport; violence, discrimination, women in sport; socialization implications from participation in sports.
Cross Listing: SPMT 319/SOCI 319.

SOCI 320 Demographic Methods
Credits 3. 3 Lecture Hours.
Procedures and techniques of demographic analysis; examination of demographic data; calculation of rates; construction of life tables; population estimates and projections.
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 322 Industrial Sociology
Credits 3. 3 Lecture Hours.
Work relations in jobs; social relations of groups and occupations and the social organization of small work groups, bureaucracies and modern large corporations.

SOCI 323/AFST 323 Sociology of African Americans
Credits 3. 3 Lecture Hours.
Major elements of the Afro-American subculture in relation to white American society and its major social institutions.
Prerequisite: SOCI 205.
Cross Listing: AFST 323/SOCI 323.
SOCI 325/ASIA 325 International Business Behavior
Credits 3.3 Lecture Hours.
Theoretical models and practical protocols/behavior demands to conduct business and to work in France, Germany, Japan, China, Mexico and other countries; discussion of national character, managerial and negotiating styles.
Cross Listing: ASIA 325/SOCI 325.

SOCI 326/RELS 326 Sociology of Religion
Credits 3.3 Lecture Hours.
Institution of religion and religious-related behavior; relationship between dynamic and structural religion and contemporary society.
Prerequisite: SOCI 205.
Cross Listing: RELS 326/SOCI 326.

SOCI 327 Morality and Society
Credits 3.3 Lecture Hours.
Examination of how moral beliefs arise, how they change, how the moral order is maintained, and how that order affects the social structure; use of case-study method.

SOCI 328 Environmental Sociology
Credits 3.3 Lecture Hours.
A comprehensive overview of environmental sociology, including major sociological theories, concepts and policy issues affecting our understanding of environmental changes; emphasizes social factors that impact environmental quality.
Prerequisite: SOCI 205 or approval of instructor.

SOCI 329/ASIA 329 Pacific Rim Business Behavior
Credits 3.3 Lecture Hours.
Theoretical models of Asian cultures and practical protocol/etiquette related to business and work in China, Thailand, South Korea, Japan, Australia, and other Pacific Rim nations; discussions of national character, managerial behavior and values.
Cross Listing: ASIA 329/SOCI 329.

SOCI 330 Sociology of Nutrition
Credits 3.3 Lecture Hours.
Social factors affecting the kind and amount of food consumed around the world; social consequences of nutritional status for family functioning and for international development.

SOCI 332/WGST 332 Alternative Genders
Credits 3.3 Lecture Hours.
Examination of theories and case studies involving alternative genders and sexualities, studies in their cultural contexts and including the role of factors such as race, class, ethnicity, age, and physical characteristics.
Prerequisites: 3 credits in SOCI or WGST; junior or senior classification.
Cross Listing: WGST 332/SOCI 332.

SOCI 335 Sociology of Organizations
Credits 3.3 Lecture Hours.
How people act in organizations; structures in organizations; the relationship between organizations and their environments.

SOCI 337 International Migration
Credits 3.3 Lecture Hours.
Survey of theories and trends in international migration.
Prerequisite: Junior or senior classification, or approval of instructor.

SOCI 338 Latino Immigration
Credits 3.3 Lecture Hours.
Theoretical and empirical examinations of the causes, processes, and impacts of Latin American immigration to the U.S.; Latino/a immigrant experience in the U.S.; effects of immigration on sending and receiving communities.
Prerequisite: Junior or senior classification or approval of the instructor.

SOCI 376 Entrepreneurial Perspectives
Credits 3.3 Lecture Hours.
Entrepreneurship as a career choice and its impact on society and economy; definitions of entrepreneurship; discovery of entrepreneurial opportunities and start-up funding; innovation and entrepreneurship theories for analyzing and predicting success of start-up and established entrepreneurial organizations.
Prerequisite: Admission to upper division in Mays Business School.

SOCI 402 Sociology of Latin America
Credits 3.3 Lecture Hours.
Latin American society; integration of viewpoints from the humanities, arts and social sciences.
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 403 Sociology of Latinos
Credits 3.3 Lecture Hours.
Exploration of social characteristics and acculturation problems of Mexican Americans in the United States; styles of life and cultural variability, social mobility, the struggle for advancement and identity through social movements.

SOCI 404/RPTS 404 Sociology of the Community
Credits 3.3 Lecture Hours.
Organization of American communities examining the bases of community, types of communities and the changes faced by communities.
Prerequisite: SOCI 205.
Cross Listing: RPTS 404/SOCI 404.

SOCI 408 Death and Dying
Credits 3.3 Lecture Hours.
Exploration of interdisciplinary social issues surrounding death and dying; the interactions among professionals, families, and dying individuals; the development and functioning of death norms and institutions (e.g., hospitals, funeral homes, hospice, capital punishment); the critical analysis of social/cultural inequalities affecting when and how we die.
Prerequisite: Junior of senior classification or approval of instructor.

SOCI 410/WGST 410 Reproduction, Birth and Power
Credits 3.3 Lecture Hours.
Examination of topics related to reproductive practices, experiences and ideologies and of the constructed and contested meanings surrounding womanhood, motherhood, sexuality, reproductive freedom and eugenics.
Prerequisites: SOCI 205; junior or senior classification.
Cross Listing: WGST 410/SOCI 410.

SOCI 411 Social Psychology
Credits 3.3 Lecture Hours.
Effects of social experience and groups on the development of personality, attitudes, values and behavior.
Prerequisite: 3 hours of sociology or psychology.
SOCI 412 Political Sociology  
Credits 3. 3 Lecture Hours.  
Survey of social bases of power; state formation in advanced industrial societies; origins of welfare state; interrelation of nationalism; culture and class formation.  
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 413 Social Movements  
Credits 3. 3 Lecture Hours.  
Survey of social movements; emphasis on social movement participation, emergence and outcomes; analysis of revolutions and movements in the developing world; theory and methods of social movement research.  
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 415 Sociology of Education  
Credits 3. 3 Lecture Hours.  
Relationship of social structure and change to education; social background and student performance; teachers and their careers; bureaucracy and change in education.  
Prerequisite: SOCI 205.

SOCI 419 Social Class in Contemporary Society  
Credits 3. 3 Lecture Hours.  
Composition and consequences of social class structure; social class explanations for lifestyle patterns, educational and occupational achievements.  
Prerequisite: SOCI 205.

SOCI 420 Advanced Methods of Social Research  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Philosophy and methods of social research, including research design; methods of observation; questionnaires, interviews and other sources of social data; qualitative and quantitative techniques of inference, analysis and research report writing.  
Prerequisite: SOCI 205.

SOCI 423 Globalization and Social Change  
Credits 3. 3 Lecture Hours.  
Examines the effects of globalization on social structure including politics, governments, corporations, work and inequality.  
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 424/WGST 424 Women and Work in Society  
Credits 3. 3 Lecture Hours.  
Social context of women’s work; work patterns, labor force participation, occupational destinations and occupational mobility; alternatives to the conventional division of labor by sex in society.  
Cross Listing: WGST 424/SOCI 424.

SOCI 425 Medical Sociology  
Credits 3. 3 Lecture Hours.  
Organization, value systems and practice of medicine and the provision of health care in the U.S.; role of physicians, health occupations and patients; marginal and folk medicine.  
Prerequisite: SOCI 205.

SOCI 426 Sociology of Work  
Credits 3. 3 Lecture Hours.  
Overview of classical and contemporary theories of work, changes in labor market structure; contemporary work place organization; occupational stratification by race, class, and gender.  
Prerequisite: Junior or senior classification or approval of instructor.

SOCI 430 Contemporary Sociological Theory  
Credits 3. 3 Lecture Hours.  
Basic ideas of contemporary sociological theory: structuralism, functionalism, conflict, symbolic interaction, exchange and their application to current research.  
Prerequisite: SOCI 230.

SOCI 445 Sociology of Law  
Credits 3. 3 Lecture Hours.  
Introduction to the sociology of law; the relation of law to general social control and to organizational dynamics.

SOCI 463 Gender in Asia  
Credits 3. 3 Lecture Hours.  
Gender dynamics in Asia; changes in gender roles; women’s movements; women and the economy; women and politics; men’s and women’s private lives.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: ASIA 463 and WGST 463.

SOCI 478 Professional Development in Sociology I  
Credit 1. 1 Lecture Hour.  
Careers fields available to sociology majors, including the nature of the work, professional expectations, and the credentials for entry in the fields.  
Prerequisite: Sociology major; junior or senior classification.

SOCI 479 Professional Development in Sociology II  
Credits 2. 2 Lecture Hours.  
Preparation for careers in sociology-related professionals by in-depth research of prospective career fields, development of oral, written, and media skills, formation of professional networks, and training in professional ethics, cultural diversity, and leadership.  
Prerequisite: Sociology major; junior or senior classification.

SOCI 484 Field Practicum  
Credits 0 to 4. 0 to 4 Other Hours.  
Field Experiences. Participation in an approved agency. Field experience will be supervised by selected agency personnel and appropriate faculty. Experiences and requirements will vary slightly according to placement and student interests.  
Prerequisites: Major in sociology; 12 hours of sociology; approval of undergraduate advisor.

SOCI 485 Directed Studies  
Credits 0 to 3. 0 to 3 Other Hours.  
Special problems not covered by other courses. Course depends upon needs and interest of the student and upon the number of credit hours.  
Prerequisite: Senior classification in sociology.

SOCI 489 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of sociology. May be repeated for credit.  
Prerequisite: Approval of instructor.

SOCI 491 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of a chosen faculty member in sociology. May be taken four times for credit.  
Prerequisites: Junior or senior classification and approval of instructor.
SOMS-Schl of Military Sciences (SOMS)

SOMS 111 Principles of Academic and Personal Development
Credit 1. 1 Lecture Hour.
Identification of personal goals and learning skills promoting academic and career success; development of personal leadership strengths, styles, motivation and values; personal development planning for self-improvement.
Prerequisite: Freshman classification or approval of instructor.

SOMS 180 Survey of Performance Based Training Methods
Credit 1. 1 Lecture Hour.
Introduction to performance oriented training methods and techniques; key concepts and generalizations of training and identification of training needs; study of representative theories of workplace training, performance evaluation, and experiential training techniques.
Prerequisite: Freshman classification or approval of instructor.

SOMS 280 Fundamentals of Peer Leadership
Credit 1. 1 Lecture Hour.
Introduction to theories of peer leadership when applied to a specific context; fundamentals and techniques of small group communication; performance evaluation; survey of basic supervisory skills.
Prerequisite: Sophomore classification or approval of instructor.

SOMS 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of leadership theory and practice. May be repeated for credit.
Prerequisites: Freshman or sophomore classification; approval of instructor.

SOMS 380 Workshop in Leadership Education
Credit 1. 1 Lecture Hour.
The study of leadership theory, intra group relationships, assessment tools for skills development, and techniques for achieving group goals.
Prerequisite: Junior classification or approval of instructor.

SOMS 381 Workshop in Leadership Education II
Credit 1. 1 Lecture Hour.
Continuation of SOMS 380. Fundamentals of small group dynamics; interpersonal communication; application of selected leadership theories; interpretation of individual assessments to include personality traits, values, and signature strengths.
Prerequisites: SOMS 380; junior or senior classification.

SOMS 481 Seminar in Executive Leadership
Credit 1. 1 Lecture Hour.
The study of contemporary leadership issues, organizational effectiveness, problem solving, and decision making.
Prerequisite: Senior classification or approval of instructor.

SOMS 482 Seminar in Executive Leadership II
Credit 1. 1 Lecture Hour.
Continuation of SOMS 481. Discussion of ethical dilemmas in leadership roles; ethical decision-making; personal accountability in organizational settings.
Prerequisite: SOMS 481 or approval of instructor.

SOMS 485 Directed Studies
Credits 1 to 4. 1 to 4 Lecture Hours.
Individual supervision of special readings or assigned projects to promote independent study; program enrichment for capable students; written and oral reports required.
Prerequisite: Approval of instructor.

SOMS 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of leadership theory and practice. May be repeated for credit.
Prerequisites: Junior or senior classification; approval of instructor.

SPAN - Spanish (SPAN)

SPAN 101 Beginning Spanish I
Credits 4. 4 Lecture Hours.
(SPAN 1411) Beginning Spanish I. Elementary language study with oral, written and reading practice; active use of the language in conversation and culture-based projects at the novice high level as defined by American Council on the Teaching of Foreign Languages; intended for those with no prior knowledge of Spanish.
Prerequisite: Prior knowledge of Spanish requires the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 102 Beginning Spanish II
Credits 4. 4 Lecture Hours.
(SPAN 1412) Beginning Spanish II. Continuation of SPAN 101. Active use of the language in conversation, writing, reading, and culture-based projects at the intermediate low level as defined by the American Council on the Teaching of Foreign Languages.
Prerequisite: SPAN 101 with a grade of C or better or placement by exam. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 140 Alternate Beginning Spanish
Credits 4. 4 Lecture Hours. 1 Lab Hour.
Accelerated review of grammatical structures covered in SPAN 101, followed by study of material covered in SPAN 102.
Prerequisite: Placement by examination or transfer credit for SPAN 101 with a grade of C or better.

SPAN 201 Intermediate Spanish I
Credits 3. 3 Lecture Hours.
(SPAN 2311) Intermediate Spanish I. Active use of the language in conversation, writing, reading and projects at the mid intermediate level as defined by the American Council on the Teaching of Foreign Languages.
Prerequisite: SPAN 102 with a grade of C or better or placement by exam. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 202 Intermediate Spanish II
Credits 3. 3 Lecture Hours.
Continuation of SPAN 201. Active use of the language in conversation, writing, reading and projects at the high intermediate level as defined by the American Council on the Teaching of Foreign Languages.
Prerequisite: SPAN 201 with a grade of C or better or placement by exam. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.
SPAN 203 Intermediate Spanish for Heritage Speakers  
Credits 3. 3 Lecture Hours.  
Focus on developing speaking, reading and writing abilities in a cultural context centered on Spanish-speaking communities in the U.S.; intended for those who understand casual spoken Spanish and have some functional communication abilities in the language because of family background or sociocultural experience.  
**Prerequisites:** SPAN 201 with a grade of C or better or placement by exam. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 208 Spanish for Health Professionals I  
Credits 3. 3 Lecture Hours.  
First half of a two-semester sequence in Spanish, at the mid intermediate level as defined by the American Council on the Teaching of Foreign Language; for those interested in careers in the health professions; presentation and practice of the most important basic communication functions in patient-provider interaction.  
**Prerequisites:** SPAN 102 with a grade of C or better or placement by exam. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 202 Intermediate Spanish for Heritage Speakers  
Credits 3. 3 Lecture Hours.  
Continuation of SPAN 203; study and practice of Spanish centered on representative texts; drafting, revision and rewriting of short compositions and term papers.  
**Prerequisites:** SPAN 202, SPAN 203, SPAN 218, or SPAN 222; or placement by exam, or approval of instructor; junior or senior classification or approval of instructor.

SPAN 218 Spanish for Health Professionals II  
Credits 3. 3 Lecture Hours.  
Second half of a two-semester course sequence in Spanish at the high intermediate as defined by the American Council on the Teaching of Foreign Languages; for those interested in careers in the health professions; presentation and practice of the most important basic communication functions in patient-provider interaction.  
**Prerequisite:** SPAN 201, SPAN 208, placement by exam, or approval of instructor. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 221 Field Studies Abroad I  
Credits 1 to 6. 1 to 6 Lecture Hours.  
Active use of the language in conversation, writing, reading and projects at the mid intermediate level, as defined by American Council on the Teaching of Foreign Languages, in a Spanish-speaking country; participation in academic and cultural activities of a host university or study abroad institute/center.  
**Prerequisite:** SPAN 202 with a grade of B or better, placement by exam, or approval of instructor. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 222 Field Studies Abroad II  
Credits 1 to 6. 1 to 6 Lecture Hours.  
Active use of the language in conversation, writing, reading and projects at the high intermediate level, as defined by American Council on the Teaching of Foreign Languages, in a Spanish-speaking country; participation in academic and cultural activities of a host university or study abroad institute/center.  
**Prerequisite:** SPAN 202 with a grade of B or better, placement by exam, or approval of instructor. Students with prior knowledge of Spanish are required to take the Spanish Placement Test before enrolling for the first time in a college Spanish course.

SPAN 285 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Individual supervision of readings or assigned projects in Spanish, selected for each student individually.  
**Prerequisite:** Approval of instructor and department head.

SPAN 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of Spanish. May be repeated for credit.  
**Prerequisite:** Approval of instructor.

SPAN 301 Oral Expression  
Credits 3. 3 Lecture Hours.  
Development of oral skills in Spanish through pronunciation practice, discussion of current events, skits, interviews, conversations, role play, impromptu debates, rhetoric, public speaking and formal presentations.  
**Prerequisites:** SPAN 202, SPAN 203, SPAN 218, SPAN 222, placement by exam, or approval of instructor; junior or senior classification or approval of instructor.

SPAN 302 Advanced Grammar  
Credits 3. 3 Lecture Hours.  
Study and practice of Spanish language structures; development of metalinguistic awareness and appropriate usage in socio-pragmatic context.  
**Prerequisites:** SPAN 202, SPAN 203, SPAN 218, or SPAN 222; or placement by exam; junior or senior classification or approval of instructor.

SPAN 303 Spanish Composition  
Credits 3. 3 Lecture Hours.  
Development of writing skills in Spanish; structural analysis of representative texts; drafting, revision and rewriting of short compositions and term papers.  
**Prerequisites:** SPAN 202, SPAN 203, SPAN 218, or SPAN 222; or placement by exam; junior or senior classification or approval of instructor.

SPAN 304 Advanced Grammar for Heritage Speakers  
Credits 3. 3 Lecture Hours.  
Continuation of SPAN 203; study and practice of Spanish centered on grammatical features of particular concern to heritage speakers in a cultural context focused on Hispanics in the U.S.  
**Prerequisites:** SPAN 202, SPAN 203, SPAN 218 or SPAN 222; or placement by exam or approval of instructor; junior or senior classification or approval of instructor.

SPAN 306 Business Spanish  
Credits 3. 3 Lecture Hours.  
**Prerequisite:** 3 credits of 300-level Spanish courses or approval of instructor.

SPAN 307 Spanish for the Sciences  
Credits 3. 3 Lecture Hours.  
Development of written and oral scientific communication in Spanish, including listening, speaking, reading and writing, with a focus on general and specialized scientific discourse; field-specific vocabulary and review of structures necessary for academic registers.  
**Prerequisites:** 3 credits of 300-level Spanish courses or approval of instructor.
SPAN 311 Hispanic Culture and Civilization to the 18th Century
Credits 3. 3 Lecture Hours.
Survey of the Hispanic world with emphasis on its history and cultural patterns from pre-Roman times to the 18th century; description and analysis of artistic, historical, literary, political topics. Taught in Spanish.
Prerequisite: SPAN 202, 203, 222 or approval of instructor.

SPAN 312 Hispanic Culture and Civilization: 18th Century to Present
Credits 3. 3 Lecture Hours.
Overview of the Hispanic world, including the United States, from independence in the Americas to present; description and analysis of artistic, historical, literary, political, sociolinguistic topics. Taught in Spanish.
Prerequisite: SPAN 202, SPAN 203, SPAN 222 or approval of instructor.

SPAN 318 Oral Communication for Health Professionals
Credits 3. 3 Lecture Hours.
Development of advanced fluency in oral communication skills in Spanish within the context of the medical professions through discussion of health issues pertaining to the Latino/Hispanic community; field trips, service learning, volunteering, interviews, impromptu speaking and formal presentations.
Prerequisite: SPAN 218, 3 credits of 300-level Spanish, or approval of instructor.

SPAN 320 Introduction to Hispanic Literature
Credits 3. 3 Lecture Hours.
Survey of literature from the Spanish-speaking world; emphasis on the language and techniques of literary analysis as applied to examples of poetry, narrative fiction, theater and essay.
Prerequisite: 3 credits of 300-level Spanish courses or approval of instructor.

SPAN 331 Spanish Literature to 1700
Credits 3. 3 Lecture Hours.
Origins and evolution of Spanish literature from the Medieval to the Golden Age traditions; epic, drama, novel, picaresque and satire as reflected in works by Berceo, Cervantes, Garcilaso de la Vega, Lope de Vega, Calderón de la Barca and others; conducted in Spanish.
Prerequisites: SPAN 202, SPAN 203, SPAN 222 or approval of instructor.

SPAN 332 Spanish Literature from 1700 to 1936
Credits 3. 3 Lecture Hours.
Representative works of Spanish Neoclassicism, Romanticism, realism, naturalism, modernism, and Avant-Garde movements; overview of historical background, cultural and philosophical tendencies; sociopolitical movements in modern Spain until the Civil War; conducted in Spanish.
Prerequisites: SPAN 202, SPAN 203, SPAN 222 or approval of instructor.

SPAN 341 Spanish-American Literature from 1492 to 1821
Credits 3. 3 Lecture Hours.
Themes, styles and authors from the meeting of Old and New Worlds through the final days of the Colony; overview of cultural and historical background; conducted in Spanish.
Prerequisites: SPAN 202, SPAN 203, SPAN 222 or approval of instructor.

SPAN 342 Spanish-American Literature from 1821 to 1935
Credits 3. 3 Lecture Hours.
Themes, styles and authors from Independence to Modernity; overview of cultural and historical background; conducted in Spanish.
Prerequisites: SPAN 202, SPAN 203, SPAN 222 or approval of instructor.

SPAN 350 Spanish Phonetics and Phonology
Credits 3. 3 Lecture Hours.
Sound system of Spanish with special reference to pronunciation and contrast with sounds of American English; phonological inventory and phonetic variation in Latin American and Peninsular varieties.
Prerequisite: 3 credits of 300-level Spanish courses or approval of instructor.

SPAN 352 Hispanic Linguistics
Credits 3. 3 Lecture Hours.
Study of Hispanic linguistics, including phonetics and phonology, morphology, syntax, change and variation.
Prerequisite: 3 credits of 300-level Spanish courses or approval of instructor.

SPAN 403 Advanced Writing in Spanish
Credits 3. 3 Lecture Hours.
Building on established skills, practice in and reflection on writing in professional, public, academic, and literary genres; evaluation of a variety of models and development of abilities in audience analysis, critical research, review and revision.
Prerequisites: SPAN 303 and 3 additional SPAN credits at the 400-level, or approval of instructor.

SPAN 407 Spanish-English Translation
Credits 3. 3 Lecture Hours.
Foundations of translation methodology, strategies and practice; rendering of literary and non-literary texts; ethics of translation; emphasis on translation into the first language.
Prerequisite: 6 credits of upper division SPAN with a grade of B or better or approval of instructor.

SPAN 409 Photography in the Hispanic World
Credits 3. 3 Lecture Hours.
Study of works produced by major photographers across the Hispanic world, from the origins of photography in the mid-19th century to the present; theoretical, historical and critical readings; analysis of various genres, modes, and formats.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 410 Hispanic Film
Credits 3. 3 Lecture Hours.
Examination of major works and directors of contemporary Hispanic film; interpretation of culture through film; relationship of literature and film; introduction to vocabulary of film criticism in Spanish.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 411 Contemporary Hispanic Society and Culture
Credits 3. 3 Lecture Hours.
Examination of cultural, economic, and political aspects central to 20th and 21st century Hispanic societies.
Prerequisites: At least 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 412 U.S. Hispanic Writers
Credits 3. 3 Lecture Hours.
Analysis of contemporary literature by U.S. Latino/a authors; discussion of prevalent themes including immigration, language, race, gender, identity.
Prerequisites: At least 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.
SPAN 413 Hispanic Culture through Art
Credits 3. 3 Lecture Hours.
Examination of the works of a major artist and/or artistic movement as a vehicle for intensive analysis of elements of Hispanic culture.
Prerequisites: At least 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 417 Advanced Spanish-English Translation
Credits 3. 3 Lecture Hours.
Expansion of translation practice and development of lexical and stylistic competence in specialized fields, including commercial, legal, medical, technical and scientific; mandatory service learning component included.
Prerequisite: SPAN 407 with a grade of B or better or approval of instructor.

SPAN 421 Spanish Language Poetry
Credits 3. 3 Lecture Hours.
Study of lyric poetry in Spanish; analysis of metrics, imagery, language and style across different periods.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 445 Cervantes
Credits 3. 3 Lecture Hours.
Analysis of Cervantes' life, cultural milieu and works; emphasis on Don Quixote, its significance in Spanish literature and in the development of the modern novel; conducted in Spanish.
Prerequisites: At least 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 450 Contemporary Spanish and Spanish-American Literature
Credits 3. 3 Lecture Hours.
Representative works of authors from both sides of the Atlantic; study of similarities and differences in themes, movements, social and aesthetic concerns among Spanish and Spanish American writers.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 452 Hispanic Sociolinguistics
Credits 3. 3 Lecture Hours.
Regional and social varieties of Spanish; variation in situational contexts (register, style, and modality); theoretical foundations of sociolinguistic variation.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 460 Topics in Hispanic Literature
Credits 3. 3 Lecture Hours.
Exploration of a significant topic, author, movement, genre or period in Hispanic literature. May be taken three times for credit when topics vary.
Prerequisite: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 461 Topics in Hispanic Culture
Credits 3. 3 Lecture Hours.
Exploration of significant socio-cultural issues in Hispanic society and their influence on cultural and artistic production. May be taken three times for credit when topics vary.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 462 Topics in Hispanic Linguistics
Credits 3. 3 Lecture Hours.
Exploration of significant topics in Hispanic linguistics from different theoretical and applied perspectives. May be taken three times when topics vary.
Prerequisites: 6 credits of 300-level Spanish courses; junior or senior classification or approval of instructor.

SPAN 483 Community Impact through Service Learning in Spanish
Credits 0 to 4. 0 to 4 Other Hours.
Directed service-learning experience in a context where Spanish is necessary to deliver services to underserved populations in the U.S. or abroad.
Prerequisites: Majors and Hispanic Studies for Community Engagement minors only; approval of undergraduate studies director; junior or senior classification.

SPAN 484 Internship
Credits 3. 3 Other Hours.
Directed internship in a Spanish-speaking professional environment to provide students with training or applied research experience appropriate to career objectives. Must be taken on a satisfactory/unsatisfactory basis. May be taken three times for credit.
Prerequisites: SPAN majors only; approval of undergraduate studies director; junior or senior classification.

SPAN 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Individual supervision of readings or assigned projects selected for each student individually; written and oral reports.
Prerequisite: Approval of instructor and department head.

SPAN 489 Special Topics in...
Credits 3. 3 Lecture Hours.
Selected topics in an identified area of Spanish. May be repeated for credit.
Prerequisite: 6 credits of 300-level Spanish; junior or senior classification.

SPAN 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in Hispanic Studies. May be repeated three times for credit.
Prerequisites: SPAN majors; junior or senior classification and approval of instructor.

SPAN 499 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in special education. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

SPED 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in special education. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of instructor.

SPED 302 Instructional Design for Students with Disabilities
Credits 3. 3 Lecture Hours.
Familiarizes pre-service teachers with research associated with effective teaching; designing and implementing of instruction for students including those with mild to moderate disabilities; designing and managing environments and materials.
Prerequisites: INST 210; junior classification.
SPED 310 Instructional Strategies for Students with Disabilities
Credits 3. 3 Lecture Hours.
Research-based strategies and techniques in teaching students who are at-risk academically or students with disabilities in a variety of general and special education settings; addresses teaching of academics, teacher strategies for engagement and incorporating the use of technology.
Prerequisite: Admission to professional phase of program.

SPED 311 Assessment of Students with Disabilities
Credits 3. 3 Lecture Hours.
Instruction in formal and informal assessment techniques used with students with disabilities, including progress monitoring; development of Individualized Educational Program plans and the IEP process.
Prerequisite: Admission to professional phase of program.

SPED 312 Effective Reading Instruction for Students with Diverse Abilities
Credits 3. 3 Lecture Hours.
Information and competencies in research-based reading instruction for students who have disabilities, are struggling readers, and are bilingual/ multilingual; includes reading assessment, dyslexia and effective instruction in phonemic awareness, phonics, reading fluency, vocabulary and comprehension, Response to Intervention (RTI) strategies, and data driven decision-making.
Prerequisite: Admission to professional phase of program.

SPED 314 Effective Mathematics Strategies for Students with Disabilities
Credits 4. 4 Lecture Hours.
Information and competencies through instruction in effective mathematics instruction for students P-12 with academic learning problems and/or disabilities; effective instruction design and teaching techniques, implementation of research-based methods relevant for active authentic learning; considers state and national standards related to teaching and learning mathematics.
Prerequisites: Admission to professional phase of program.

SPED 414 Methods and Issues in Low-Incidence Disabilities
Credits 3. 3 Lecture Hours.
Overview of learning and behavioral characteristics of individuals with low-incidence disabilities such as intellectual disability, autism, physical disabilities, traumatic brain injury, sensory impairments, and multiple disabilities; research-based practices in assessment and education and designing educational environments that facilitate active participation, self-advocacy and independence.
Prerequisites: Admission to professional phase of program.

SPED 422 Teaching Students with Emotional Disturbances and Behavior Disorders
Credits 3. 3 Lecture Hours.
Research-based techniques and materials used in the instruction of students who have emotional and behavioral disorders across a variety of classroom and other educational environments; includes identification and assessment issues, placements, family involvement, and historical and legal issues.
Prerequisites: Admission to professional phase of program.

SPED 471 Classroom Management and Behavioral Interventions
Credits 3. 3 Lecture Hours.
Effective management of classrooms; includes research-based models of classroom discipline, proactive strategies that prevent misbehavior, interventions that decrease problem behaviors, and management systems appropriate for students with disabilities.
Prerequisites: Admission to professional phase of program.

SPED 491 Research
Credits 0 to 4. 0 to 4 Lecture Hours.
Research conducted under the direction of faculty member in special education. May be repeated 2 times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

SPMT - Sport Management (SPMT)

SPMT 217 Foundations of Sport Management
Credits 3. 3 Lecture Hours.
History, principles, and objectives of the sport management profession; an overview of the structure of the sport industry; introduction to the scope and variety of career opportunities in sport.

SPMT 220 Olympic Studies
Credits 3. 3 Lecture Hours.
History of the Olympic Games and their development over time; analyze, compare and contrast the relationship between the Olympics, cultures and societies; examination of central problems, accomplishments and collaborations revolving around the Olympics from a variety of viewpoints.

SPMT 225 Practical Skills for Sport Professionals
Credits 3. 3 Lecture Hours.
Introduction to the writing, communication and technical skills required to succeed in the sport industry; segmented into units based on different professions within the sport industry such as journalism, marketing, technology, public relations, organizational communication and law.

SPMT 230 Introduction to Leadership in Sport Organizations
Credits 3. 3 Lecture Hours.
Attainment and application of leaderships skills in the sports setting; analysis of sports leaders and their styles; ethics in sport leaders; preparation to work in youth sports institutions; youth community agencies and sport related non-profit agencies.

SPMT 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Work on a specified topic with the intent of promoting independent reading, research and study; supplement existing course offerings or subjects not presently covered. May be repeated for credit.
Prerequisites: Freshman or sophomore classification; approval of instructor.

SPMT 289 Special Topics in...
Credits 0 to 4. 0 to 4 Lecture Hours.
Selected topics in an identified area of sport management. May be repeated for credit.

SPMT 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of a faculty member in sport management. May be repeated 4 times for credit.
Prerequisites: Freshman or sophomore classification; approval of instructor.

SPMT 304 Sport Psychology Management and Practice
Credits 3. 3 Lecture Hours.
The relationship of psychology to sport and exercise; topics include history, application of learning principles, social psychology, personality variables, psychological assessment, youth sport, and diversity issues in sport and exercise.
Prerequisite: Junior classification.
SPMT 319/SOCI 319 Sociology of Sport
Credits 3. 3 Lecture Hours.
Social institution of sport and its consequences for American society; social organization from play to professional sport; violence, discrimination, women in sport; socialization implications from participation in sports.
Prerequisite: Junior or senior classification.
Cross Listing: SOCI 319/SPMT 319.

SPMT 321 Risk Management in Sport Organizations
Credits 3. 3 Lecture Hours.
Legal principles and rules of law affecting the administration and operation of health, human performance, recreation and sports programs, resources, areas and facilities; risk management and legal concepts applied to contracts, human rights, constitutional issues, supervision of recreation activities and torts.
Prerequisites: Junior or senior classification; or approval of instructor.

SPMT 330 Application of Leadership Skills in Sport Organizations
Credits 3. 3 Lecture Hours.
Development and application of leadership vision to sport organizations; development of leadership skills that create collaborative and management of groups in sports organizations.
Prerequisites: SPMT 230 with a grade of C or better.

SPMT 333 Sport Management
Credits 3. 3 Lecture Hours.
Introduction to techniques for proper management of programs in physical activities and athletics including the basic physical education instructional program, intercollegiate and interscholastic athletics, intramural and club programs, and alternative athletic programs such as health clubs, corporate fitness centers and YMCA/YWCAs.
Prerequisites: Junior or senior classification; admission to professional phase of program.

SPMT 334 Sport Communication
Credits 3. 3 Lecture Hours.
Communications from the interorganizational level to mass media specific within the unique setting of sport industry.
Prerequisites: Junior or senior classification; sport management majors only or approval of instructor.

SPMT 336 Diversity in Sport Organizations
Credits 3. 3 Lecture Hours.
Examine an encompassing perspective of diversity within North American and international sport organizations.
Prerequisite: Junior or senior classification.

SPMT 337 International Sport Business
Credits 3. 3 Lecture Hours.
The magnitude of global expansion and development of sport familiarity with major firms and organizations on the global scene, major issues in global sports; emphasis on business opportunities available internationally; underlying thesis focuses on the contrasts from the U.S. sport industry to foreign markets.
Prerequisite: Junior or senior classification.

SPMT 340 Sport Governance
Credits 3. 3 Lecture Hours.
Governance and policy development in sport management; managerial activities related to governance, strategic management, ethics in sport, governance and policy development in specific sport contexts.
Prerequisite: Junior or senior classification.

SPMT 342 Financing Sport Operations
Credits 3. 3 Lecture Hours.
Study of financial theories and practical application as they impact sport revenues and expenditures; familiarization with current issues and trends in financing sport organizations.
Prerequisites: Junior or senior classification; admission to professional phase of program.

SPMT 350 Professional Practice in Sport Management
Credits 3. 3 Lecture Hours.
Information, perspectives and skills to promote the management of sports in the community, school, workplace and sport business settings; boundary-crossing partnerships across sport disciplines; the role of collaborative efforts to improve the needs of the sport community.
Prerequisite: Admission to professional phase of program; senior classification.

SPMT 402 Pre-Internship Field Experiences
Credit 1. 2 Lab Hours.
Orientation, observations and experiences in preparation for professional internships.
Prerequisites: Senior classification; approved acceptance to field experience.

SPMT 412 Managing Sport Events
Credits 3. 3 Lecture Hours.
Examination of principles involved in planning and managing sport events.
Prerequisites: Junior or senior classification or approval of instructor.

SPMT 420 Sports Facility Planning
Credits 3. 3 Lecture Hours.
Examination of the principles involved in planning and managing sports and recreational facilities.
Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-sport management majors.

SPMT 421 Legal Aspects of Sport
Credits 3. 3 Lecture Hours.
Explores the relationship between sport and law, and the fundamentals of law used by sport managers, including contract law, tort law, Constitutional issues, employment and discrimination law, the effect of state and federal statutes on recreational activities and sport, and current legal issues in sports.
Prerequisites: Junior or senior classification; admission to professional phase of program or approval of instructor for non-sport management majors.

SPMT 422 Financing Sport Operations
Credits 3. 3 Lecture Hours.
Study of financial theories and practical application as they impact sport revenues and expenditures; familiarization with current issues and trends in financing sport organizations.
Prerequisites: Junior or senior classification; admission to professional phase of program.

SPMT 423 Marketing Aspects of Sport
Credits 3. 3 Lecture Hours.
Investigation of the rapidly developing sports industry from a marketing perspective; familiarization of marketing terms and tools needed in the sports industry; introduction to the various aspects of marketing that make up the marketing plan.
Prerequisites: Junior or senior classification; admission to professional phase of program.

SPMT 450 Professional Practice in Sport Management
Credits 3. 3 Lecture Hours.
Information, perspectives and skills to promote the management of sports in the community, school, workplace and sport business settings; boundary-crossing partnerships across sport disciplines; the role of collaborative efforts to improve the needs of the sport community.
Prerequisite: Admission to professional phase of program; senior classification.

SPMT 481 Seminar
Credit 1. 1 Lecture Hour.
A variety of topical seminars in communicating contemporary and historical sport management subjects designed to complement the curriculum in sport management. May be taken three times for credit.
Prerequisite: Admission to the professional phase of the sport management program; junior or senior classification; or approval of instructor.
SPSC - Spatial Sciences (SPSC)

SPSC 102 Introduction to Spatial Sciences
Credit 1. 1 Lecture Hour.
Provides an understanding of spatial sciences; how it is applied for problem solving in a wide variety of fields; and survey of the field and what opportunities are available to professionals in spatial science.

SPSC 461/AGSM 461 Geographic Information Systems for Resource Management
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Geographic Information System (GIS) approach to the integration of spatial and attribute data to study the capture, analysis, manipulation and portrayal of natural resource data; examination of data types/forms, as well as the integration of GIS with remote sensing and Global Positioning System; laboratory includes extensive use of GIS applications to conduct analyses of topics in natural resources.
Prerequisite: Approval of instructor.
Cross Listing: AGSM 461/SPSC 461.

STAT - Statistics (STAT)

STAT 182 Foundations of Statistics
Credit 1. 1 Lecture Hour.
Elementary topics in statistics; data collection; design of experiments; confidence intervals, hypothesis testing; ethics in statistics; the role of statistics in industry, the health profession and the sciences.
Prerequisite: Statistics majors only.

STAT 201 Elementary Statistical Inference
Credits 3. 3 Lecture Hours.
(MATH 1342, 1442) Elementary Statistical Inference. Data collection, tabulation and presentation; elementary description of the tools of statistical inference; probability, sampling and hypothesis testing; applications of statistical techniques to practical problems. May not be taken for credit after or concurrently with any other course in statistics or SCMT 303.

STAT 211 Principles of Statistics I
Credits 3. 3 Lecture Hours.
Introduction to probability and probability distributions; sampling and descriptive measures; inference and hypothesis testing; linear regression, analysis of variance.
Prerequisite: MATH 152 or MATH 172.

STAT 212 Principles of Statistics II
Credits 3. 3 Lecture Hours.
Design of experiments, model building, multiple regression, nonparametric techniques and contingency tables.
Prerequisite: STAT 211.

STAT 301 Introduction to Biometry
Credits 3. 3 Lecture Hours.
Intended for students in animal sciences. Introduces fundamental concepts of biometry including measures of location and variation, probability, tests of significance, regression, correlation and analysis of variance which are used in advanced courses and are being widely applied to animal-oriented industry. Credit will not be allowed for more than one of STAT 301, STAT 302 or STAT 303.
Prerequisite: MATH 141 or MATH 166 or equivalent.

STAT 302 Statistical Methods
Credits 3. 3 Lecture Hours.
Intended for undergraduates in the biological sciences. Introduction to concepts of random sampling and statistical inference; estimation and testing hypotheses of means and variances; analysis of variance; regression analysis; chi-square tests. Credit will not be allowed for more than one of STAT 301, STAT 302 or STAT 303.
Prerequisite: MATH 141 or MATH 166 or equivalent.

STAT 303 Statistical Methods
Credits 3. 3 Lecture Hours.
Intended for undergraduates in the social sciences. Introduction to concepts of random sampling and statistical inference; estimation and testing hypotheses of means and variances, analysis of variance, regression analysis, chi-square tests. Credit will not be allowed for more than one of STAT 301, STAT 302 or STAT 303.
Prerequisite: MATH 141 or MATH 166 or equivalent.

STAT 307 Sample Survey Techniques
Credits 3. 3 Lecture Hours.
Concepts of population and sample; the organization of a sample survey; questionnaire design. Basic survey designs and computation of estimates and variances.
Prerequisite: STAT 301 or STAT 302 or STAT 303 or SCMT 303.
STAT 404 Statistical Computing  
Credits 3. 3 Lecture Hours.  
Statistical programming in R and SAS; random number generation;  
design of simulation studies; interactive and dynamic statistical  
graphics; parallel computing in statistics.  
Prerequisites: STAT 212; junior or senior classification or approval of  
instructor.

STAT 406 Design and Analysis of Experiments  
Credits 3. 3 Lecture Hours.  
Design fundamentals; completely randomized designs; blocking;  
factorial, nested, nested-factorial designs; incomplete designs; fractional  
factorial designs; confounding; general mixed factorial designs; split pilot;  
analysis of covariance; crossover designs; power analysis; sample size  
determination.  
Prerequisite: STAT 212; STAT 408.

STAT 407 Principles of Sample Surveys  
Credits 3. 3 Lecture Hours.  
Principles of sample surveys and survey design; techniques for variance  
reduction; simple, stratified and multi-stage sampling; ratio and  
regression estimates; post-stratification; equal and unequal probability  
sampling.  
Prerequisite: STAT 212.

STAT 408 Introduction to Linear Models  
Credits 3. 3 Lecture Hours.  
Introduction to the formulation of linear models and the estimation of  
the parameters of such models, with primary emphasis on least squares.  
Application to multiple regression and curve fitting.  
Prerequisite: STAT 212; MATH 304.

STAT 414 Mathematical Statistics I  
Credits 3. 3 Lecture Hours.  
Mathematical theory of statistics; probability, random variables and their  
distributions, transformations of random variables, expectations and  
variance, generating functions, sampling distributions and basic limit  
theorems.  
Prerequisite: MATH 221, MATH 251 or MATH 253.

STAT 415 Mathematical Statistics II  
Credits 3. 3 Lecture Hours.  
Continuation of the mathematical theory of statistics, including principles  
for statistical inference, formulation of statistical models, reduction  
of data, point estimation, confidence intervals, hypothesis testing and  
Bayesian inference.  
Prerequisite: STAT 414.

STAT 426 Methods in Time Series Analysis  
Credits 3. 3 Lecture Hours.  
Autocorrelation and spectral characteristics of univariate, autoregressive  
and moving average models; identification, estimation and forecasting.  
Prerequisites: STAT 408; STAT 415 or approval of instructor.

STAT 436 Multivariate Analysis and Statistical Learning  
Credits 3. 3 Lecture Hours.  
Matrix algebra; random vectors; multivariate distributions; copulas;  
multivariate generalizations of classical testing; principle component  
analysis; discriminant analysis; clustering; multidimensional scaling;  
factor analysis; canonical analysis.  
Prerequisites: MATH 304 or MATH 323; STAT 212; STAT 415 or  
equivalent.

STAT 438 Bayesian Statistics  
Credits 3. 3 Lecture Hours.  
Analysis of scalar and vector-valued parameters; Bayesian linear models;  
Monte Carlo computational methods; prior elicitation; hypothesis testing  
and model selection; hierarchical models; selected advanced models; use  
of statistical packages such as WinBUGS, R or MATLAB.  
Prerequisites: MATH 221; STAT 408 or equivalent.

STAT 445 Applied Biostatistics and Data Analysis  
Credits 3. 3 Lecture Hours.  
Applications of regression methods in biostatistics; correlated data  
analysis; survival analysis; missing data techniques; use of the R  
programming language.  
Prerequisites: STAT 212; STAT 408 or approval of instructor.

STAT 446 Statistical Bioinformatics  
Credits 3. 3 Lecture Hours.  
Analysis of high-dimensional genomic and proteomic data using R;  
sequence analysis; genome-wide association studies; proteomics; array-  
based technologies; classification techniques.  
Prerequisites: STAT 212; STAT 408 or approval of instructor.

STAT 459 Categorical Data Analysis  
Credits 3. 3 Lecture Hours.  
Techniques for the analysis of categorical data; contingency table  
analysis; logistic regression; Poisson regression; loglinear models;  
analysis of ordinal data; use of computer software such as SAS or R.  
Prerequisite: STAT 212; STAT 408 or equivalent.

STAT 482 Statistics Capstone  
Credits 3. 3 Lecture Hours.  
Integration of statistical models, design, sampling, graphics and  
computing for the analysis of real problems; planning, drafting,  
revising and editing reports; ethics; principles of collaboration and  
communication.  
Prerequisites: STAT 404; STAT 406; STAT 408 and senior classification.

STAT 485 Directed Studies  
Credits 1 to 6. 1 to 6 Other Hours.  
Special problems in statistics not covered by another course in the  
curriculum. Work may be in either theory or methodology.  
Prerequisite: Approval of instructor.

STAT 489 Special Topics in…  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of statistics. May be repeated for  
credit.  
Prerequisite: Junior or senior classification or approval of department  
head.

STAT 491 Research  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Research conducted under the direction of faculty members in statistics.  
May be taken four times for credit. Registration in multiple sections of  
this course is possible within a given semester provided that the per  
semester credit hour limit is not exceeded.  
Prerequisite: Junior or senior classification or approval of instructor.
STLC - Student Learning Center (STLC)

STLC 001 Basic Mathematical Skills
Credits 1 to 3. 1 to 3 Lecture Hours.
Developmental instruction in mathematics; includes the integers and rational numbers and applications, exponents, polynomials, solution of equations, graphing, elementary geometry and reasoning skills. May not be used for credit toward a degree.

STLC 002 Basic Writing Skills
Credits 1 to 3. 1 to 3 Lecture Hours.
Individualized instruction in English composition based on an analysis of the student's proofreading, revision and editing skills; a programmed sequence of study and practice designed for improvement of writing performance through mastery of basic skills at word, sentence, paragraph and multiparagraph levels. May not be used for credit toward a degree.

STLC 003 Basic Reading Skills
Credits 1 to 3. 1 to 3 Lecture Hours.
Individualized instruction in reading based on an analysis of the student's reading comprehension skills; study and practice of reading strategies designed to increase reading comprehension skills. May not be used for credit toward a degree.

STLC 101 Application of Learning Theories to College Studies
Credits 2. 2 Lecture Hours.
The study of critical theories of learning with application to academic performance; designated as the university's learning framework course, this course is designed to help students understand learning theory and develop strategies for successful completion of college level studies.

STLC 102 Career Awareness
Credits 2. 2 Lecture Hours.
Encourages planning career and life goals early in academic career for timely decision-making related to academics, acquiring marketable skills, pursuing relevant experiential education, and participating in student/professional organizations; acquaints students with realities of early career, emphasizes utilization of resources on a timely basis for competitiveness in job market.

STLC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 1 to 4 Lab Hours.
Selected topics in academic development and improvement.
Prerequisite: Approval of coordinator.

TCMG - Technology Management (TCMG)

TCMG 272 Technology and End-User Support
Credits 3. 3 Lecture Hours.
Upgrading, setup, configuration, troubleshooting of computer systems; development of skills to work with end-users; technology needs assessment; escalation and defusing strategies; service learning and community engagement.
Prerequisite: Sophomore classification.

TCMG 274 Foundations of Networking in Education
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Development of knowledge towards application of telecommunications facilities in networking; technical alternatives for delivery of subject matter for educators and trainers.
Prerequisites: TCMG 272 or concurrent enrollment, or approval of instructor.

TCMG 275 Directed Studies
Credits 0 to 12. 0 to 12 Lecture Hours.
Directed readings or research problems in industrial technology.

TCMG 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of industrial technology. May be repeated for credit.

TCMG 291 Research
Credits 0 to 4. 0 to 4 Lecture Hours.
Research conducted under the direction of faculty member in technology management. May be repeated 3 times for credit.

TCMG 303 Unix System Administration Practices
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Development and system administration of the Unix operating system; technical alternatives for proactive and reactive maintenance of system health.
Prerequisites: TCMG 272 and TCMG 274 with a grade of C or better; junior or senior classification or approval of instructor.

Credits 4. 3 Lecture Hours. 3 Lab Hours.
Development and system administration of graphical user interface-based operating systems; identification of security issues, required system maintenance procedures, user account provisioning to foster identity and access management strategies, theories of identity and access management.
Prerequisites: TCMG 272 and TCMG 274 with a grade of C or better; junior or senior classification or approval of instructor.

TCMG 308 Cybersecurity and Digital Ethics
Credits 3. 3 Lecture Hours.
Introduction to cybersecurity; analysis of threats and risks from the environment; development of appropriate strategies to mitigate impact; ethics of extraordinary administrative access; ethics of digital forensics and implications to society.
Prerequisites: TCMG 272 and TCMG 274 with a grade of C or better; junior or senior classification or approval of instructor.

TCMG 316 Database Systems Administration and Application
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Database administration and application use techniques; database structures, modeling, configuration, development, security, topologies and access; focus on system administration of Unix-based database systems.
Prerequisite: TCMG 303 with a grade of C or better.

TCMG 402 Instructional Technology and Design
Credits 3. 3 Lecture Hours.
Design principles; development of instruction; contemporary issues and trends; foundations in learning research; requirements for instruction, task and needs analysis; learning situations and instructional models; hardware and software innovations; assessing instructional outcomes; factors affecting utilization.
Prerequisites: EHRD 371 with a grade of C or better; junior or senior classification or approval of instructor.
TCMG 412 Contemporary Issues in Technology Management
Credits 3. 3 Lecture Hours.
Specific innovation or practices nascent to the professional information technology industry; discovery of practical applications and analytics of new innovation.
Prerequisites: TCMG 272 and TCMG 274 with a grade of C or better; junior or senior classification.

TCMG 476 Technical Network Capstone
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Development of knowledge and skills towards the application of technical network management in public education and corporate training settings; focus on practices, techniques and tools for managers of technical networks.
Prerequisites: TCMG 303 or TCMG 304 with a grade of C or better; junior or senior classification.

TCMG 484 Professional Internship
Credits 6. 6 Other Hours.
Directed internship in an organization to provide students with a learning experience supervised by professionals in organizational settings appropriate to the student’s professional objectives; must be in good standing with the University. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: EHRD 481 and EHRD 490 with a grade of C or better; approval of instructor.

TCMG 485 Directed Studies
Credits 0 to 12. 0 to 12 Other Hours.
Directed readings or research problems in industrial technology.
Prerequisites: Junior or senior classification; approval of directed studies application.

TCMG 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of industrial technology. May be repeated for credit.
Prerequisite: Approval of instructor.

TCMG 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in technology management.
Prerequisites: Junior or senior classification; approval of instructor.

TEED - Teacher Education (TEED)

TEED 302 Teaching/Learning Processes: Psychological Perspectives on Education
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Psychological perspectives on instruction; examines learning processes, learner motivation, home and cultural influences, learning strategies; design and delivery of instruction; controversies regarding learning and instruction.
Prerequisites: Junior classification; admission to teacher education.

TEED 425 Supervised Clinical Teaching
Credits 12. 36 Other Hours.
Supervised Student Teaching. Culmination of teacher education program; integrate and apply knowledge and skills learned from program of study while observing and participating in accredited schools with university supervision. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Admission and retention in teacher education program; successful completion of all coursework.

TEFB - Teacher Ed Field Based (TEFB)

TEFB 273 Introduction to Culture, Community, Society and Schools
Credits 3. 2 Lecture Hours. 3 Other Hours.
Field-based course that introduces the culture of schooling and classrooms for analysis within the lens of language, gender, racial, socioeconomic, ethnic and academic diversity; the family as a partner in education and educational equality discussed.

TEFB 322 Teaching and Schooling in Modern Society
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Development, structure, management and finance of secondary schools; historical, philosophical, ethical and moral dimensions of teaching; role of school in a democratic society; teaching as a profession.
Prerequisite: Junior or senior classification.

TEFB 323 Teaching Skills I
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Study and development of teaching skills necessary for reflective problem solving, managing classroom learning environments, motivating students to learn, and making ethical decisions; emphasis given to models and theories of human behavior, informal and formal data collection techniques, and diversity of learners. Phase III of the secondary program.
Prerequisites: Successful completion of TEFB 322; admission to teacher education.

TEFB 324 Teaching Skills II
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Study and development of teaching skills necessary for applying instructional strategies; teaching general strategies, assessing student learning, and analyzing and synthesizing multiple source data; emphasis given to adolescent development and cultures and to teacher and child cultures.
Prerequisites: Successful completion or concurrent enrollment in TEFB 322; junior or senior classification.

TEFB 371 Dynamics and Management in Multicultural/Inclusionary Learning Environments
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Field-based course focusing on communication, methodology and management perspectives that lead to democratic classrooms; organizational structures that focus on transformative, inclusionary learning; interventions for students with disabilities; analysis of systemic conditions placing children from diverse backgrounds and representing diverse abilities in positions of “risk” for incomplete success in school.
Prerequisites: Junior classification; admission to teacher education; concurrent enrollment in EDCI 454.

TEFB 401 Language Arts in the Middle and Senior School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Methodology of teaching language arts-related content with specific reference to language, literature, journalism, drama and speech interactions among these areas; development of oral competence; coordination with other subjects. Phase IV, Practicum I.
Prerequisites: Completion of Phases I, II and III of the secondary program; admission to teacher education; enrollment in language arts-related teaching field.
TEFB 404 Social Studies in the Middle and Senior High School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Features of social studies instruction in grades 6-12; approaches, methods and instructional materials. Phase IV, Practicum I.
Prerequisites: Completion of Phases I, II and III of the secondary program; admission to teacher education; enrollment in history and/or social science teaching field.

TEFB 406 Science in the Middle and Secondary School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Methods course for the prospective secondary teacher in the physical and biological sciences; implementation of contemporary curricula. Phase IV, Practicum I.
Prerequisites: Completion of Phases I, II and III of the secondary program; admission to teacher education; enrollment in science-related teaching field.

TEFB 407 Mathematics in the Middle and Senior School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Design and teach selected topics from middle and secondary school mathematics. Content, materials and methodology. Phase IV, Practicum I.
Prerequisites: Completion of Phases I, II and III secondary program; admission to teacher education; enrollment in mathematics teaching field.

TEFB 410 Social Studies and the Humanities in the Elementary School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Recent trends, issues and procedures related to curriculum development and instruction in the social studies and humanities; integration of content, planning, design of appropriate teaching/learning experiences and evaluation; preparation of prototype materials.
Prerequisites: Admission to teacher education; concurrent enrollment in RDNG 467, TEFB 410 and TEFB 412.

TEFB 412 Mathematics in the Elementary School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Introduction to understanding of modern mathematics; integration of content, history and application of discovering techniques using problem solving approach; developing an understanding of four fundamental procedures—structure, measurement, sets, fractions—and communication of important mathematical concepts to elementary children.
Prerequisites: MATH 365 and MATH 366; admission to teacher education; concurrent enrollment in RDNG 467, TEFB 410 and TEFB 413.

TEFB 413 Science in the Elementary School
Credits 3. 2 Lecture Hours. 6 Lab Hours.
Designed to help elementary teachers understand basic concepts of science and scientific methods; content relates to natural phenomena involving physical, chemical and biological processes; elementary students appreciation and interest in science.
Prerequisites: TEFB 273; admission to teacher education; concurrent enrollment in RDNG 467, TEFB 410 and TEFB 412 required.

TEFB 423 Supervised Student Teaching
Credits 3. 12 Other Hours.
Observation and participation in an accredited public school classroom; techniques of teaching student’s teaching fields, and appropriate instructional strategies for assigned student population in fulfillment of endorsement requirements. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Admission to teacher education program and to student teaching.

TEFB 426 Supervised Clinical Teaching
Credits 6. 24 Other Hours.
Culmination of teacher education program; integrate and apply knowledge and skills learned from program of study while observing and participating in accredited schools with university supervision. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Admission and retention in teacher education program; successful completion of all coursework.

TEFB 429 Supervised Clinical Teaching
Credits 9. 36 Other Hours.
Culmination of teacher education program; integrate and apply knowledge and skills learned from program of study while observing and participating in accredited schools with university supervision. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Admission and retention in teacher education program; successful completion of all coursework.

TEFB 484 Internship
Credits 5. 40 Other Hours.
Directed internship in a public school classroom.
Prerequisites: Senior classification; TEFB 483.

TEFB 499
Credits 15. 39 Lecture Hours.

THAR - Theatre Arts (THAR)

THAR 101 Introduction to Western Theatre and Drama
Credits 3. 2 Lecture Hours. 3 Lab Hours.
(DRAM 1310) Introduction to Western Theatre and Drama. Survey of the styles and genres of dramatic literature, theatrical production and tasks of the actor, director and designer.

THAR 102 Script Analysis
Credits 3. 3 Lecture Hours.
Introduction in analyzing dramatic structure as represented in European and American plays; focus on the art of the playwright.

THAR 110 Acting I: Fundamentals
Credits 3. 2 Lecture Hours. 4 Lab Hours.
(DRAM 1351) Acting I: Fundamentals. A Stanislavsky-based approach to the fundamentals of acting, which may include sensory exercises, relaxation, concentration, imagination, improvisation, character analysis and scene work.

THAR 115 Voice and Articulation
Credits 3. 3 Lecture Hours.
(SPCH 1342, DRAM 2336) Voice and Articulation. Voice mechanism and use of phonetic alphabet to determine sound placement and production for speech and voice improvement. Analysis and practice of relaxation, pitch, rate, resonance, quality, and volume through class exercise and performance.

THAR 135 Theatre Technology I
Credits 3. 2 Lecture Hours. 4 Lab Hours.
(DRAM 1330) Theatre Technology I. Survey of theatre performance spaces, basic tools and set construction, basic scenic, lighting, sound and properties design and construction; participation on departmental production crews required.

THAR 155 History of Western Dress
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Evolution of dress in Western civilization; consideration of influences of politics, religion, economics, visual arts and social mores on choices of dress.
THAR 156 Dress, Culture and Society  
Credits 3. 3 Lecture Hours.  
Relationship of dress to humans as biological, aesthetic and social beings; dress as cultural performance.

THAR 201 Introduction to World Theatre  
Credits 3. 3 Lecture Hours.  
Non-Western theatre, its origins and continuing influence on society and Western theatre; emphasis on the theaters of India, China, Japan, Africa, the Caribbean and Latin America.

THAR 210 Acting II: Characterization  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
(DRAM 1352) Acting II: Characterization. Continuation of THAR 110; intermediate course which focuses on improvisation, voice, movement, scene study, ensemble, with emphasis on character development and analysis.  
Prerequisite: THAR 110. Majors and minors only or approval of instructor.

THAR 245 Basic Theatrical Design  
Credits 3. 3 Lecture Hours.  
Elements and principles of design for the theatre; role of the designer within the production team, theoretical and practical applications in the visual interpretation of plays; participation in departmental productions.

THAR 250 Stage Makeup  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
(DRAM 1341) Stage Makeup. An analytical approach to the visualization of characters focusing on research and design, application techniques and media.  
Prerequisites: THAR 102, THAR 110 or approval of instructor.

THAR 255 Costume Technology I  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
(DRAM 1342) Costume Technology I. Survey of the costume process from concept to realization; basic hand and sewing machine techniques; basic patterning and fitting methods; and crafts techniques; participation on departmental production crews required.

THAR 280 History of the Theatre I  
Credits 3. 3 Lecture Hours.  
(DRAM 2361) History of the Theatre I. Survey of the history of Western theatre from primitive times to the closing of the theatres in England in 1642. For non-theatre majors and minors only.

THAR 281 History of the Theatre II  
Credits 3. 3 Lecture Hours.  
(DRAM 2362) History of the Theatre II. Survey of the history of Western theatre from the closing of the theatres in England in 1642 to the present; brief introduction to the theatre of the East. For non-theatre majors and minors only.

THAR 282 American Theatre  
Credits 3. 3 Lecture Hours.  
Surveys American theatrical production and drama from colonial times to the present; focus on various theatre artists and movements which have shaped, and been shaped by, American culture.

THAR 285 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Individual study of identified topics in the theatre for specific needs of theatre arts majors; formal report required.  
Prerequisites: Six hours of theatre arts and approval of instructor and department head; THAR majors and minors only.

THAR 289 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours.  
Selected topics in an identified area of theatre production, technology, history or criticism. May be repeated for credit.

THAR 290 Theatre Practicum: Crew  
Credit 1. 4 Other Hours.  
(DRAM 1121, DRAM 2120, DRAM 2121) Theatre Practicum: Crew. Participation in the run crew for a departmental theatre production under supervision of theatre arts faculty; audition or application may be required. May be taken two times for credit.

THAR 291 Research  
Credits 0 to 3. 0 to 3 Other Hours.  
Research conducted under the direction of a faculty member in theatre arts. May be taken up to two times for credit.  
Prerequisites: Freshman or sophomore classification and approval of instructor.

THAR 301 Performance in World Cultures  
Credits 3. 3 Lecture Hours.  
Application of the tools of performance studies to explore the enactment of the arts in world cultures and the ways the people of every society express themselves in performance; examination of different genres of performance through music, theatre, verbal art and dress.  
Prerequisite: Junior or senior classification or approval of instructor.  
Cross Listing: MUSC 301 and PERF 301.

THAR 302 Dramaturgy  
Credits 3. 3 Lecture Hours.  
Exploration of literary, production and theoretical dramaturgy in a classroom setting; script analysis, theatre criticism, theories of theatre, research techniques and dramaturgy in the production process, advancing thought about the art form in all its complexity; research methods for theatre.  
Prerequisites: THAR 102; majors and minors only or approval of instructor.

THAR 308 Stage Management and Arts Administration  
Credits 3. 3 Lecture Hours.  
Planning and managing artistic events and performances; basic concepts of management theories, creating budgets, stage and production management, and grant applications; attendance of departmental events required.  
Prerequisite: Approval of instructor.

THAR 310 Acting III: Period Styles  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
Exploration of acting techniques associated with various periods and non-realistic styles of theatre; scene work emphasized.  
Prerequisites: THAR 110 and THAR 210 or approval of instructor.

THAR 321 Design and Technology for Performance  
Credits 3. 3 Lecture Hours. 1 Lab Hour.  
Principles and practical application of techniques for designing theatre, music and other types of live performance; practical aspects of designing and producing live performances: plays, music events, devised performances, performance art; topics include lighting, sets and space, clothing and costume design, sound; may include specialized techniques such as masks, props, makeup. May be repeated for credit.  
Prerequisites: Junior or senior classification, major or minor in PERF, or approval of instructor.
THAR 322 Acting and Directing for Performance
Credits 3. 3 Lecture Hours. 1 Lab Hour.
Acting, movement, music and directing techniques for plays and other
types of performances focusing on collaboration among all participants;
principles of realistic and non-realistic acting, including non-Western
styles of performance, music and physical movement and principles of
stage direction. May be repeated for credit.
Prerequisites: Junior or senior classification, major or minor in PERF, or
approval of instructor.

THAR 328/MUSC 328 Japanese Traditional Performing Arts
Credits 3. 3 Lecture Hours.
Study of various genres of Japanese performing arts from the 7th century
to the present; understanding the genres in their historical and cultural
contexts and recognizing shared aesthetic values.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: MUSC 328/THAR 328.

THAR 335 Theatre Technology II
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Planning, design and execution of scenic, lighting, sound and properties
design construction; participation in departmental crews required. May
be repeated once for credit.
Prerequisites: THAR 135; participation in departmental productions.

THAR 345 Scene Design
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Drafting techniques as applied to scenic design; scenic construction
techniques; design projects to include perspective rendering, ground
plans, elevations, working drawings and models.
Prerequisites: THAR 102, THAR 135 and THAR 245, or approval of the
instructor.

THAR 355 Costume Design
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Role and responsibilities of costume designer; design projects to
include rendering techniques, stylistic choices and alternative analytical
approaches.
Prerequisites: THAR 102, THAR 245, or approval of instructor.

THAR 360 Lighting Design
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Basic electricity; theatre lighting instrumentation and maintenance; color
theory and color media; stage lighting theory and technique; preparation
of light plot, instrumentation schedule and cue sheets; operation of
lighting equipment; laboratory practice and participation on departmental
productions crews is required.
Prerequisites: THAR 102, THAR 135 and THAR 245, or approval of
instructor.

THAR 381 Theatre History and Dramatic Literature I
Credits 3. 3 Lecture Hours.
Survey of the history of theatre and drama from ancient times to c. 1700;
examination of the evolution of theatre and drama from primitive rituals
to highly stylized writing and performance in Europe and Asia.
Prerequisites: THAR 102; majors and minors only; junior or senior
classification.

THAR 382 Theatre History and Dramatic Literature II
Credits 3. 3 Lecture Hours.
Continuation of THAR 381. Survey of the history of theatre and drama
from 1700 to the present; examines the evolution of theatre and drama in
Africa, the Americas, Asia and Europe.
Prerequisites: THAR 381; majors and minors only; junior or senior
classification.

THAR 386/MUSC 386 Evolution of the American Musical
Credits 3. 3 Lecture Hours.
Examination of the American musical from its heterogeneous origins to
a thriving and diverse expression of the human condition; analysis and
critical discourse on the development of the American musical through
text, audio and visual recordings.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: MUSC 386/THAR 386.

THAR 390 Theatre Practicum: Performance
Credit 1. 4 Other Hours.
Participation as a performer in a departmental theatre production
under supervision of theatre arts faculty; audition or application may be
required. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

THAR 391 Theatre Practicum: Production
Credit 1. 4 Other Hours.
Participation in the production team for a departmental theatre
production under supervision of theatre arts faculty; audition or
application may be required. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

THAR 392 Theatre Practicum: Design
Credit 1. 4 Other Hours.
Participation as a performer in a departmental theatre production
under supervision of theatre arts faculty; audition or application may be
required. May be taken two times for credit.
Prerequisite: Junior or senior classification or approval of instructor.

THAR 407 Performing Literature.
Credits 3. 3 Lecture Hours.
Analysis and performance of poetry, prose and drama; emphasis on
translating analytical decisions into performance; solo performance,
readers theatre, chamber theatre, and technology in/as performance.
Prerequisite: Junior or senior classification.

THAR 410 Acting IV - Advanced Problems in Acting
Credits 3. 3 Lecture Hours.
Solving advanced dramatic problems using acting, voice, movement,
and style techniques; writing, development and performance of an
autobiographical monologue; includes audition preparation and rehearsal
techniques.
Prerequisites: THAR 310; junior or senior classification.

THAR 420 Directing
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Theatre forms and styles; director's function and responsibility in
producing plays; script analysis; directing laboratory scenes;
participation in departmental productions.
Prerequisites: THAR 102, THAR 110, THAR 245, THAR 381, or approval of
instructor.

THAR 435 New Technology for Designers
Credits 3. 3 Lecture Hours.
Fundamentals of design software including sound editing, video editing,
and rendering for theatre; multi-media installation.
Prerequisites: PEFR 202 or THAR 135; THAR 245; junior or senior
classification; or approval of instructor.
THAR 445 Design as Performance
Credits 3. 3 Lecture Hours.
Design as performance using research methods and the production of new work; disciplines of design, performance, installation and performance as research.
Prerequisites: THAR 245 and junior or senior classification; or approval of instructor.

THAR 482 Topics in American Theatre and Performance
Credits 3. 3 Lecture Hours.
Exploration of significant issues in American theatre and performance; emphasis on the aesthetic, social, and cultural issues affecting theatre and performance. May be taken two times for credit.
Prerequisites: THAR 102 and THAR 382 or approval of instructor; junior or senior classification.

THAR 485 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
I, II, S Advanced individual study of identified topics in theatre for specific needs of theatre arts majors; formal report required. May be repeated for credit up to 6 hours.
Prerequisites: 24 hours of theatre arts; THAR majors and minors only or permission of instructor.

THAR 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of theatre production, technology, history, or criticism. May be repeated for credit.
Prerequisite: Approval of instructor.

THAR 491 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of a faculty member in theatre arts. May be taken two times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

UGST - Undergraduate Studies
(UGST)

UGST 181 First Year Seminar
Credits 0 to 3. 0 to 3 Lecture Hours.
Seminar on various contemporary topics; introduction to high quality college instruction and research; focus on writing, speaking, discussion and research; open to all majors; restricted to first-time-in-college students and limited in size to provide small class experience. May be taken two times for credit.

UGST 182 Topics in Undergraduate Studies
Credits 0 to 3. 0 to 3 Lecture Hours.
Selected interdisciplinary topics related to specific programs as identified by the office of undergraduate studies; for students in approved first year programs. May be taken two times for credit.
Prerequisite: Freshman classification or approval of instructor.

UGST 211 UScholar Personal Statement
Credits 0-1. 0-1 Lecture Hours.
Oral and written reflection on values, goals, and opportunities; preparation of personal statement appropriate for nationally competitive scholarship application. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: University Scholar classification.

UGST 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study on selected topics in undergraduate studies. May be taken six times for credit.

UGST 311 UScholar Exploration Series
Credits 0-1. 0-1 Lecture Hours.
Selection from a variety of discussion topics designed to foster student-faculty interaction, intellectual and cultural enrichment, inter-and cross-disciplinary connections, and the development of interest and knowledge of issues outside of a student’s degree area. May be taken six times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification or approval of instructor; admitted to University Scholar program.

UGST 405 Thesis Writing
Credits 0-1. 0-1 Lecture Hours.
Accessing information, searching scholarly literature, and oral or poster presentation of scholarly work and formal research thesis. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification; admitted to Undergraduate Research Scholars.

UGST 484 Internship
Credits 0 to 3. 0 to 3 Other Hours.
Directed internship in a community, public or private organization to provide students with on-the-job training and/or applied research experience appropriate to career objectives. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

UGST 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study on selected topics in undergraduate studies. May be taken six times for credit.

UGST 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of a faculty member in undergraduate studies. May be taken three times for credit.
Prerequisites: Junior or senior classification and approval of instructor.

UGST 492 Cooperative Education in Public Policy
Credits 0 to 3. 0 to 3 Lecture Hours.
Educational work assignment in public policy setting related to student’s career interest and course of study; supervision of the student will be by the cooperating employer and the instructor; reports, approved by course instructor, will be required. May be taken two times for credit.
Prerequisites: Junior or senior classification and participation in Public Policy Internship Program.

UGST 497 Capstone
Credits 0 to 6. 0 to 6 Lecture Hours.
Demonstrating mastery of discipline as applied to an original problem through an independent, mentored project; public presentation of work. May be taken two times for credit. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Junior or senior classification; admitted to Undergraduate Service Scholars program.
URPN - Urban & Reg Planning (URPN)

URPN 200 Introduction to Landscape Architectural Practice
Credit 1. 1 Lecture Hour.
Explores and evaluates the diversity of landscape architectural practice; defines the traditional practice forms and examines evolving and boundary expanding opportunities for future practice; introduces the departmental curriculum and faculty.

URPN 201 The Evolving City
Credits 3. 3 Lecture Hours.
Introduction to the history of contemporary urban and regional planning and how the evolving forms of cities and regions pose opportunities and/or challenges for planners; understanding key social, economic, political and technological forces that shape city form and function and its ramifications for urban and regional planning.

URPN 202 Building Better Cities
Credits 3. 3 Lecture Hours.
Determinants of land use patterns; classification of uses; idealized conceptual alternatives; location and size criteria; mapping; comprehensive planning process, relationship to circulation planning.

URPN 210 Urban Analytical Methods I
Credits 3. 3 Lecture Hours.
Study of various analytical techniques used in urban and regional decision making; quantitative approaches to analyze and manipulate data; utilization of statistical packages for data, analysis and communication to enhance urban planning modeling.
Prerequisite: URPN majors only or approval of instructor.

URPN 220 Digital Communication I
Credits 3. 3 Lecture Hours.
Applications of computer graphics, rendering, and visualization software in urban design, landscape architecture, and environmental analysis; introduction to basic concepts and principles of graphic composition; rendering, visualization, and linkages to landscape-referenced data.
Prerequisite: Landscape Architecture and Urban Planning majors only or approval of instructor.

URPN 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty member in landscape architecture and urban planning. May be taken 2 times for credit.
Prerequisite: Freshman or sophomore classification.

URPN 300 Planning Law
Credits 3. 3 Lecture Hours.
Familiarization with the fundamental principles of planning law and legislation; legal foundation for the urban planning process; alternative methods of plan implementation; emphasis on legal issues as they impact land use planning and development at the municipal level of government; participation in mock advocacy trials and public hearings.
Prerequisites: URPN 301; URPN majors only.

URPN 301 Urban Analytical Methods II
Credits 3. 3 Lecture Hours.
Focuses on research conducted by planners, sociologists, anthropologists, political scientists and a variety of applied social scientists; examines variety of procedures employed when conducting research in urban areas; furthers understanding and knowledge of statistical methods employed in social research and elements of geographical analysis.
Prerequisite: Upper division College of Architecture; URPN 210 or approval of instructor, URPN majors only.

URPN 320 Digital Communication II
Credits 3. 3 Lecture Hours.
Advanced applications of computer graphics, rendering, and visualization software in urban design, landscape architecture, and environmental analysis; introduction to basic concepts and principles of graphic composition, rendering, visualization, and linkages to landscape-referenced data.
Prerequisites: URPN 220; department majors only.

URPN 325 Introduction to GIS in Urban and Regional Planning
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Provides an understanding of GIS fundamentals; basic concepts, principles and functions; essential skills for applying GIS in various fields such as urban planning, landscape architecture, land development, environmental studies, transportation and hazard management; based on learning through class projects.
Prerequisite: Upper division College of Architecture; department majors only or approval of instructor.

URPN 326 Advanced GIS in Urban and Regional Planning
Credits 3. 3 Lecture Hours.
Advanced instruction in applications of spatial tools for urban planning, landscape architecture, land development, hazard management, and related problems; GIS applications through review of literature and practice; data quality, uncertainty, the integration of GPS, remote sensing and information technology within the context of urban and regional planning.
Prerequisite: URPN 325 or approval of instructor, department majors only.

URPN 330 Land Development I
Credits 3. 3 Lecture Hours.
Interface between the physical and financial dimensions in design and development to achieve building and project economies; creating a physical product and a financial venture that are responsive to social and environmental concerns and to market economy and finance.
Prerequisite: Department majors only or approval of instructor.

URPN 331 Public and Private Infrastructure Funding
Credits 3. 3 Lecture Hours.
An introduction to issues of financing public and public-private development project; exploring the difference between raising revenue, including the trade offs associated with establishing a sustainable tax base, and raising capital through capital markets; illustration of the range of decisions with financing public and public-private partnerships.
Prerequisite: Upper division College of Architecture; URPN majors only.
URPN 340 Housing and Community
Credits 3. 3 Lecture Hours.
Housing, its development, planning, marketing, designing, financing and production; social and design history and contemporary issues of American housing development, urban renewal, neighborhood structure and community facilities.
Prerequisite: Department majors and minors only or approval of instructor.

URPN 360 Issues in Environmental Quality
Credits 3. 3 Lecture Hours.
Issues in environmental quality; focus on stormwater and ecosystem qualities influenced by land development; design and planning principles and techniques (e.g., low impact development) for sustainable stormwater management in urban and suburban watersheds.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 361 Urban Issues
Credits 3. 3 Lecture Hours.
Issues pertaining to the evolution and development of cities and urban regions; examines the socio-economic, cultural and physical development of urban areas; addresses contemporary problems such as racial tension, unemployment and poverty, housing, pollution, and environmental sustainability, traffic and congestion, land use, crime, public health, and other quality of life issues.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 369 Transportation and Urban Form
Credits 3. 3 Lecture Hours.
Examination of the interrelated nature of transportation, land use and urban design; familiarization with the role of transportation in contemporary society; understanding the interrelationships between transportation and urban form at both the regional and community levels.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 370 Health Systems Planning
Credits 3. 3 Lecture Hours.
Introduction to planning in the health care system at both institutional and community levels.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 371 Environmental Health Planning and Policy
Credits 3. 3 Lecture Hours.
Philosophical and historical relationships of human-environment-disease; environmental health domains and associated planning and policy organizations and initiative for monitoring, intervention, and prevention; interdisciplinary approaches for risk analysis of environmental health.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 401 Policy Implementation
Credits 3. 3 Lecture Hours.
Techniques of implementing major urban development programs and plans; capital improvements programming and budgeting; overview of regulatory measures including zoning and subdivision regulations; public involvement process; and fiscal planning.
Prerequisite: URPN majors only.

URPN 440 Urban and Regional Economic Development
Credits 3. 3 Lecture Hours.
Examines economic development processes in urban and regional planning; issues explored include theoretical, the economic development planning process, ethics, location factors, intergovernmental relations, budgeting, and private sector revenue generation.
Prerequisite: URPN majors only or approval of instructor.

URPN 441 Neighborhood Revitalization
Credits 3. 3 Lecture Hours.
Examination of the causes of decline of central cities, with the goal of developing a realistic view of who is affected, and why, so that a realistic foundation can be laid for successful redevelopment projects; topics and case studies on downtown decline and redevelopment, older city neighborhood problems and retrofitting.
Prerequisite: URPN majors only or approval of instructor.

URPN 450 Emergency Management Principles and Practices
Credits 3. 3 Lecture Hours.
Introduction to the fundamental principles of emergency management.
Prerequisite: Upper division College of Architecture or approval of instructor.

URPN 451 Hazard and Vulnerability Analysis for Planners
Credits 3. 3 Lecture Hours.
Tools and techniques used by city planners and emergency managers to determine their jurisdictions’ hazard risk and social vulnerability to disaster impacts.
Prerequisite: Junior or senior classification, URPN 450 or approval of instructor.

URPN 460 Sustainable Communities
Credits 3. 3 Lecture Hours.
Focuses on sustainable community with applications in public policy/design including societal organization, disciplinary bound design and policy, and empowered approaches to design, social ecology and public policy; reading and review of relevant literature on sustainability, complemented with exercises to illustrate underlying principles.
Prerequisite: Department majors and minors only or approval of instructor.

URPN 469 Urban Infrastructure
Credits 3. 3 Lecture Hours.
Foundation of planning and managing infrastructure and public services; utilization of life-cycle method of infrastructure planning and delivery, research theory and tools to perform basic infrastructure planning.
Prerequisite: URPN majors only or approval of instructor.

URPN 470 Health Systems Planning and Policy
Credits 3. 3 Lecture Hours.
Analyzes health needs at community, regional and national levels; organization and supply of health services at community, regional and national levels; medical technology and its impact on health needs and system organization; medical care financing and its effects on health need and system organization; health planning for natural and human-made disasters; and service-learning for applying planning theories and methods.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 471 Planning Healthier Communities
Credits 3. 3 Lecture Hours.
Planning for the creation of healthier cities/communities; emphasis on the impact of global paradigmatic shifts regarding community health, stakeholder participation, coalition building, leadership, visioning the planning process, and the need for more systemic and process orientation in community building.
Prerequisite: Junior or senior classification or approval of instructor.

URPN 481 Seminar
Credits 3. 3 Lecture Hours.
Seminar discussion of current topics in urban planning.
Prerequisite: Senior classification.
VIBS - Vet Integrative Biosci (VIBS)

VIBS 204 Fundamentals of Food Toxicology and Safety
Credits 3. 3 Lecture Hours.
Toxicity and safety of various foods and food additives, ingredients and contaminants; occurrence, control and prevention of food transmitted diseases.
Prerequisite: Sophomore classification and CHEM 101.

VIBS 222 Great Poisonings of the World
Credits 3. 3 Lecture Hours.
Exploration of the effect of intentional and accidental man-made and natural poisonings on humans and the environment and their impact on public policy.
Prerequisite: Freshman or sophomore classification.

VIBS 310 Biomedical Writing
Credit 1. 1 Lecture Hour.
Mechanisms by which knowledge is shared among researchers, clinicians and other science professionals, then disseminated to the general public; an assortment of written assignments to develop writing skills specific for communicating scientific concepts to a variety of audiences. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Junior or senior classification.

VIBS 311 Biomedical Explorations through Narrative
Credit 1. 1 Lecture Hour.
Familiarization with the writing style required for biomedical and health science; instruction in writing styles and appropriate techniques to increase and strengthen writing abilities. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: VIBS 310 or approval of instructor.

VIBS 343 Histology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Normal tissues of vertebrates including histogenesis of some; histogenesis and organography of mammalian tissues.
Prerequisites: BIOL 114 and BIOL 124; CHEM 228; junior or senior classification; BIMS major with a minimum overall 2.5 Texas A&M GPA.
VIBS 401 Developmental Neurotoxicology
Credits 2. 2 Lecture Hours.
Effects of exposure to toxic substances on the developing nervous system; content to include mechanisms of toxicity of substances potentially devastating to the developing nervous system including lead, mercury and other heavy metals, alcohol, nicotine (smoking), pesticides, flame retardants, and others.
Prerequisite: Junior or senior classification.

VIBS 404 Food Toxicology and Safety
Credits 3. 3 Lecture Hours.
Toxicity and safety of various foods and food additives, ingredients, and contaminants; occurrence, control and prevention of food transmitted diseases.
Prerequisite: Junior or senior classification.

VIBS 407/NRSC 407 Core Ideas in Neuroscience
Credit 1. 1 Lecture Hour.
General overview of selected core ideas across the full spectrum of neuroscience.
Prerequisite: Junior or senior classification; background in science courses recommended.

VIBS 408 Neuroscience and Religion
Credits 3. 3 Lecture Hours.
Emphasis on the biology of the human mind in the context of religious implications.
Prerequisites: Junior or senior classification; concurrent enrollment in NRSC 407/VIBS 407 or VIBS 407/NRSC 407.

VIBS 411 Tumor Cell Biology and Carcinogenesis
Credits 3. 3 Lecture Hours.
Principles of tumor biology; role of gene-environment interactions; molecular mechanisms regulating cancer initiation and progression; therapeutic treatment of cancer.
Prerequisites: BIMS 320/GENE 320 or equivalent; junior or senior classification.

VIBS 413 Introduction to Epidemiology
Credits 3. 3 Lecture Hours.
Study and measurement of disease and health in populations; examples from literature and current events; emphasizes concepts and appreciation for epidemiologic approaches and applications in life.
Prerequisite: Junior or senior classification.

VIBS 420 Computer Applications in Public Health Research
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to the use of computers for public health research applications, including word processing, spreadsheets, data base management and telecommunications.
Prerequisites: Senior classification or approval of instructor; BIMS major with a minimum overall 2.5 Texas A&M GPA.

VIBS 422 Endocrine Toxicology
Credits 4. 4 Lecture Hours.
Impacts of endocrine toxicity on endocrine system; prevalence, environmental and occupational use and disposal of environmental endocrine disrupting chemicals (EDCs); structure, toxicokinetics and mechanism of action of EDCs; effects of EDCs on the development and function, disorders and diseases of the endocrine and reproductive organs.
Prerequisites: Senior classification; approval of instructor.

VIBS 424/VTPP 424 Biomedical Neuroendocrinology and Endocrine Disorders
Credits 3. 3 Lecture Hours.
Neuroendocrine (hypothalamus-pituitary) control of puberty, menstruation, ovulation, pregnancy, labor, lactation, female reproductive cycles, male reproductive functions, thyroid and parathyroid, adrenal and kidney, diabetes, obesity, sleep, memory, learning and aging and their endocrine disorders; overview on biosynthesis, transport and signaling of peptide and neuropeptide hormones, steroids and prostaglandins.
Prerequisites: Honors, junior or senior classification, or approval of instructor.
Cross Listing: VTPP 424/VIBS 424.

VIBS 426/ENTO 426 Methods in Vector-Borne Disease Ecology
Credits 3. 1 Lecture Hour. 5 Lab Hours.
Methodological understanding of how vector-borne diseases are studied in the field and laboratory; hands-on exploration of the ecology disease systems in a one health framework; concepts of design, execution and presentation of research projects; outdoor field work and bio-safety level 2 laboratory.
Prerequisites: Junior or senior classification and approval of instructor.
Cross Listing: ENTO 426/VIBS 426.

VIBS 432 Public Health Practices
Credits 3. 3 Lecture Hours.
Study of various diseases, causes and methods of prevention; epidemiology of disease; social and behavioral sciences; health policy and management; environmental and occupational health.
Prerequisites: Junior or senior classification; BIMS major with a minimum overall 2.5 Texas A&M GPA.

VIBS 443 Biology of Mammalian Cells and Tissues
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Molecular phenomena placed in context with tissues, organs and organ systems; cell and tissue structures visualized by light microscopy and electron micrographs for functional relationships; clinical correlations reveal relevance of histology in specific disease states; conceptual thinking exercises facilitate problem solving skills.
Prerequisites: Junior or senior classification in life sciences and interest in health related careers.

VIBS 447 Neurophysiology of Music
Credits 2. 2 Lecture Hours.
Exploration of the heritability and genetics of musical talent, the physiology and physics of hearing, and the neurophysiology of processing sound using primarily German and Austrian compositions. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: Junior or senior classification.

VIBS 450/NRSC 450 Mammalian Functional Neuroanatomy
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Functional morphology of the domestic animal and human brain using gross specimens, microscopic sections, interactive computer-, DVD- and video-assisted instructional programs supplemented with clinical case studies.
Prerequisites: Junior or senior classification; BIMS, biology, biochemistry, or psychology majors, or neuroscience minors with overall 3.5 Texas A&M GPA; or approval of instructor.
Cross Listing: NRSC 450/VIBS 450.
VIBS 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of a selected problem in veterinary anatomy (with emphasis on neuroscience, cell biology, reproduction, developmental biology, marine mammal anatomy) approved by instructor or selected problems in veterinary public health (with emphasis on food safety, toxicology, epidemiology, informatics, zoonoses).
Prerequisites: Junior or senior classification and approval of instructor.

VIBS 489 Special Topics in...
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproduction, developmental biology, marine mammal anatomy) or selected topics in veterinary public health, epidemiology, zoonoses, food hygiene, food toxicology and mycotoxicology. May be repeated for credit.
Prerequisites: Junior or senior classification and approval of instructor; BIMS major with a minimum overall 2.5 Texas A&M GPA.

VIST - Visual Studies (VIST)

VIST 105 Principles of Design I
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Survey of principles and theory of design and visual communication; elements and organizational structure of the visual language; sign, symbol, and meaning; visual perception; problem solving and the creative process; design in terms of value as well as color; emphasis on two-dimensional design.

VIST 106 Principles of Design II
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Fundamentals of spatial design; theory of form; transformations, additive/subtractive techniques as process; 3D composition; traditional modeling and construction techniques; formal visual analysis and critique.
Prerequisite: VIST 105.

VIST 170 Introduction to Visualization Computing Environments
Credit 1. 2 Lab Hours.
Procedures, practices and environments useful for visual problem solving using programmatic languages; setup and use of the computing environment; useful system tools and commands; basic programming concepts and constructs.
Prerequisite: Visualization majors only or approval of instructor.

VIST 201 Writing for Design
Credit 1. 2 Lab Hours.
Writing as a discipline for the development, conceptualization, critique and presentation of visual works; emphasis on portfolio and narrative development.
Prerequisite: Major in visualization.

VIST 205 Principles of Design III
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Introduction to the creative processes, workflows and methodologies used in the field of visualization including graphic design, interactivity and animation.
Prerequisites: ARTS 115; VIST 106; VIST 170.

VIST 206 Visual Studies Studio I
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Theory and practice of traditional techniques for visual communication and visualization; the camera model; principles of physically based motion; time based media and animation; development of narrative and storytelling in the creative process.
Prerequisite: VIST 205.

VIST 270 Computing for Visualization I
Credits 3. 3 Lecture Hours.
Introduction to the theory and practice of visual computer based problem solving; system tools; problem solving principles and practice; basics of software interaction and interface organization; development concepts and principles useful in digital art and visualization production.
Prerequisite: MATH 151; VIST 170.

VIST 271 Computing for Visualization II
Credits 3. 3 Lecture Hours.
Continuation of Computing for Visualization I; concepts of object oriented programming; emphasis on principles and techniques useful for three dimensional visualization and real time graphic display.
Prerequisite: MATH 152; VIST 270.

VIST 275 Introduction to Visualization
Credits 3. 3 Lecture Hours.
Introduction to visualization concepts, techniques and applications; introduction to significant visualization topics including cultural context, visual perception, the digital image, visual language, geometric modeling, animation, image creation, image compositing; application areas, ethical issues in visualization and the future of visualization.
Prerequisites: MATH 150 or equivalent; non-majors only.

VIST 284 Visualization Techniques
Credit 1. 2 Lab Hours.
Introduction to software used in the visual arts including 2D raster and vector systems, modeling, rendering, animation, post production and multimedia. Specific course content will vary based upon curriculum requirements. May be repeated for up to 3 credit hours.
Prerequisite: Major in visualization or minor in art.

VIST 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of visualization. May be repeated for credit.
Prerequisite: Approval of instructor.

VIST 305 Visual Studies Studio II
Credits 3. 1 Lecture Hour. 5 Lab Hours.
Theory and practice of visual communication employing digital and conventional media; development of artistic concepts, proposal development and related implementation techniques; introduction to digital painting, 3D modeling, animation and post production.
Prerequisites: VIST 206; upper level classification in visualization.

VIST 310 Photography for Visualization
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Advanced aesthetic and thematic control of the digital image; exposure refinement; advanced lighting techniques and digital compositing; digital workflow; image conversion and control; color management; digital forensics; printing technology, processes and presentation.
Prerequisites: Visualization major or approval of instructor; junior or senior classification.
VIST 370 Interactive Virtual Environments  
**Credits 3. 3 Lecture Hours.**  
Languages and techniques useful for the creation of real time virtual environments; definition of formal scene description structures; modeling and transformation techniques; simulation techniques; behaviors and message passing; user interaction and animation; multiuser environments; creating virtual interfaces; scripting techniques.  
**Prerequisite:** Visualization majors; junior or senior classification; VIST 271.

VIST 372 Creating Digital Environments  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**  
Terminology, principles and practices in the creation of 3D models; mathematical principles of geometrical modeling theory and application of modeling techniques; boolean operations; parametric modeling; modeling, particle systems; L-Systems; nurbs and/or grammar based techniques; lighting setup and control.  
**Prerequisite:** Visualization majors; junior or senior classification; VIST 271.

VIST 374 Multimedia Design and Development  
**Credits 3. 2 Lecture Hours. 4 Lab Hours.**  
Concepts and techniques for integrating multimedia with user control and interactivity; production of computer presentations and interactive mobile devices; computer animation, graphics, production and use of digital images; scripting techniques; projects for stand-alone computers and mobile devices.  
**Prerequisite:** Junior or senior classification or approval of instructor and undergraduate program coordinator.

VIST 375 Foundations of Visualization  
**Credits 3. 3 Lecture Hours.**  
A comprehensive introduction to visualization concepts, techniques and applications; major topic areas include cultural context, application areas, visual perception, the digital image, visual language, coordinate systems, geometric representation, modeling animation, image synthesis, image composing, ethics and the future of visualization.  
**Prerequisites:** MATH 152; VIST 271; junior or senior classification.

VIST 405 Visual Studies Studio III  
**Credits 3. 1 Lecture Hour. 5 Lab Hours.**  
Theory and practice in the art and science of the visual image; scientific and mathematical principles as process; information theory and sensorial design; interactivity and user integration; integration of real and virtual environments including lighting design and material definition.  
**Prerequisites:** VIST 305; CARC 301 or VIST 494.

VIST 406 Visual Studies Studio IV  
**Credits 3. 1 Lecture Hour. 5 Lab Hours.**  
Theory and practice in the development of the digital image; non-traditional modeling methods; camera control and animation techniques; special effects; creative lighting methods; non-photorealistic rendering; integration of traditional and digital media in the creation of visual works.  
**Prerequisites:** VIST 305; CARC 301 or VIST 494.

VIST 432 Applied Perception  
**Credits 3. 3 Lecture Hours.**  
An advanced introduction to perceptual science, including the cognitive, neural and evolutionary processes that undergird perceptual systems as well as the variety of perceptual factors that influence design decision.  
**Prerequisite:** Visualization major; junior or senior classification or approval of instructor.

VIST 441 Scientific and Technological Developments in Visual Arts  
**Credits 3. 3 Lecture Hours.**  
Advanced level course focusing on the relationship between art, science and technology; visual arts before the digital revolution; the development of computer graphic arts.  
**Prerequisite:** Upper level classification or approval of the undergraduate program coordinator.

VIST 442 Digital Characters: Art, Technology, Uses and Meaning  
**Credits 3. 3 Lecture Hours.**  
Examination of the art and technology employed in the creation of digital characters; exploration of the reasons for, and impact of, their use in popular media and science; digital character creation techniques; estimating performance requirements; visual examples and written work used to illustrate topics and application areas.  
**Prerequisite:** Junior or senior classification.

VIST 465 Art, Culture and Time Based Media  
**Credits 3. 2 Lecture Hours. 4 Lab Hours.**  
Exploration of perception, vision and self-expression for communication through time based media; investigation of expression, vision, and visual language as a process; practice of visual communication strategies.  
**Prerequisites:** Junior or senior classification or approval of instructor.

VIST 470 Digital Rendering  
**Credits 3. 3 Lecture Hours.**  
Creation of photorealistic images; rendering techniques and control; perceptual and physical principles related to creating realistic images; lighting and environmental effects; properties of materials; rendering models and techniques for adding visual detail; shading languages.  
**Prerequisite:** Visualization majors; junior or senior classification; VIST 271.

VIST 472 Digital Compositing  
**Credits 3. 3 Lecture Hours.**  
History, mathematical foundations, techniques and applications used in combining two dimensional images for film, video and multimedia; includes theoretical foundations of the digital image, color spaces and corrections, matte techniques, keying, rotoscoping, camera and object tracking, stereo compositing and process workflow.  
**Prerequisite:** VIST 271, junior or senior classification.

VIST 474 Designing for the Web  
**Credits 3. 2 Lecture Hours. 4 Lab Hours.**  
Principles of web page and site creation; elements of visual design; typography for the web; web technologies; controlling the page real estate through cascading style sheets (CSS); imaging for the web; creation and use of color and graphics; web standards; building complete web sites.  
**Prerequisite:** Junior or senior classification or approval of instructor and undergraduate program coordinator.

VIST 484 Summer Internship  
**Credits 3. 3 Lecture Hours.**  
Practical experience in a visualization related company; 10-week internship with a minimum of 400 hours continuous employment; departmental pre-approval through the departmental internship coordinator required; post evaluation conducted following the internship. May not be repeated for credit.  
**Prerequisites:** Upper level classification in visualization and approval of visualization intern coordinator.
VIST 485 Directed Studies
Credits 1 to 6. 1 to 6 Other Hours.
Special problems in visual studies. May be repeated for up to 9 credit hours.
**Prerequisite:** Approval of instructor and undergraduate program coordinator.

VIST 486 Introduction to Game Design
Credits 3. 3 Lecture Hours.
Computer game design; emphasis on interactive storytelling, game play and interface design; history of computer games, review of selected games; analysis of rules of play and simple game prototype development.
**Prerequisite:** Junior or senior classification.

VIST 487 Game Development
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Aesthetic and technical aspects of computer game development, including game mechanics, story development, content creation and game programming; includes game design, interface design, 3D modeling and animation, graphics algorithms, shader programming and artificial intelligence; group project includes the design and development of a game from start to finish.
**Prerequisite:** VIST 486 or CSCE 441 or approval of instructor; junior or senior classification.

VIST 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified field of visual studies. May be repeated for up to 9 credit hours.
**Prerequisite:** Approval of instructor and undergraduate program coordinator.

VIST 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of faculty members in visualization; emphasis on visual studies. May be repeated 2 times for credit.
**Prerequisites:** Upper level classification; approval of instructor and undergraduate program coordinator.

VIST 494 Internship
Credits 6. 6 Other Hours.
Practical experience in a visualization related company; equivalent of 600 hours over at least 15 weeks; departmental pre-approval through the departmental internship coordinator required; post evaluation conducted following the internship. May not be repeated for credit.
**Prerequisites:** Upper level classification in visualization and approval of visualization intern coordinator.

VLCS-Vet Large Animal Clin Sc (VLCS)

VLCS 422 Equine Disease and Epidemiology
Credits 3. 3 Lecture Hours.
Principles and methods of epidemiology applied to equine health and prevention and control of selected equine infectious diseases.
**Prerequisite:** Enrollment in equine certificate and junior or senior classification, or approval of instructor.

VLCS 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of selected problems in biomedical sciences approved by instructor. May be repeated for credit.
**Prerequisites:** Senior classification in biomedical science and approval of department head.

VSCS-Vet Small Animal Clin Sc (VSCS)

VSCS 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of a selected problem in biomedical sciences approved by instructor. May be repeated for credit.
**Prerequisites:** Junior or senior classification and approval of department head.

VTPB - Veterinary Pathobiology (VTPB)

VTPB 212 Genetics in the News
Credits 3. 3 Lecture Hours.
Use of contemporary news articles from the popular press to delve into the science of genetics and genomics and their methodologies to gain a deeper understanding of how data is analyzed and interpreted leading to news headlines.
**Prerequisites:** Sophomore classification or approval of instructor; high school or college course in biology recommended.

VTPB 221 Great Diseases of the World
Credits 3. 3 Lecture Hours.
Great infectious and parasitic diseases; introduction to the major diseases affecting humans and other mammals including plague, tuberculosis, AIDS and malaria.
**Prerequisite:** Freshman or sophomore classification.

VTPB 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed individual study of selected problems in microbiology, parasitology, immunology, genetics or pathology as approved by instructor.
**Prerequisites:** Approval of department head; freshman or sophomore classification.

VTPB 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of veterinary pathobiology. May be repeated for credit.
**Prerequisite:** Freshman classification.

VTPB 301/WFSC 327 Wildlife Diseases
Credits 3. 3 Lecture Hours.
Basic mechanisms of diseases as they occur in wildlife populations; interplay of habitat requirements, individual physiological requirements and disease producing mechanisms of varied wildlife species.
**Prerequisite:** Junior classification or approval of department head.
**Cross Listing:** WFSC 327/VTPB 301.

VTPB 303 Medical Communication in the International Community
Credits 2. 2 Lecture Hours.
To develop an awareness that there is a culture associated with the practice of veterinary and human medicine in other countries.
**Prerequisite:** Junior or senior classification.
VTPB 334 Poultry Diseases  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic and contagious diseases. 
Prerequisites: BIOL 113 and BIOL 123; junior or senior classification.

VTPB 404 Amazon Field School  
Credits 4. 4 Lecture Hours.  
Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences and solutions to biodiversity loss through ecology, culture and governance. 
Prerequisites: Junior or senior classification with a minimum GPA of 2.0 and approval of instructor. 
Cross Listing: RPTS 454 and WFSC 454.

VTPB 405 Biomedical Microbiology  
Credits 5. 3 Lecture Hours. 5 Lab Hours.  
Fundamentals of bacteriology, mycology, virology, infectious diseases, immunology and identification of pathogenic microorganisms. 
Prerequisite: Junior classification in a biological science.

VTPB 407 Advanced Veterinary Microbiology Laboratory  
Credits 1 to 3. 1 to 4 Lab Hours.  
Modular course (one credit per module) that covers immunological and molecular techniques used with bacteria, parasites and viruses in animals for diagnostic and identification purposes. 
Prerequisites: VTPB 405, VTPB 409 and VTPB 438 or concurrent enrollment; junior or senior classification.

VTPB 408 Clinical Microbiology  
Credits 4. 2 Lecture Hours. 5 Lab Hours.  
Practical application of clinical bacteriology and mycology; laboratory identification of pathogenic organisms. 
Prerequisites: VTPB 405; junior or senior classification.

VTPB 409 Introduction to Immunology  
Credits 3. 3 Lecture Hours.  
Diverse concepts relative to immunologic mechanisms inherent to domestic and laboratory animals. 
Prerequisite: Advanced classification.

VTPB 410 Cell Mechanisms of Disease  
Credits 3. 3 Lecture Hours.  
Mechanisms, morphologic manifestations and clinical signs of disease processes at the cellular level. 
Prerequisites: VTPP 423 or registration therein; junior or senior classification.

VTPB 412 Techniques of Clinical Pathology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Theory and pathophysiologic principles underlying laboratory evaluation of disease states; principles of analytical methods with applications in the contemporary biomedical laboratory considered, using selected hematology and clinical chemistry techniques as examples. 
Prerequisites: CHEM 228 and CHEM 238; VTPP 423; senior classification in biomedical science or approval of instructor.

VTPB 415 Immunogenetics and Comparative Immunology  
Credits 3. 3 Lecture Hours.  
Genetic mechanisms used to diversify immune receptors; immunoglobulins, T cell receptors, major histocompatibility complex, natural killer cell receptors, toll-like receptors and many others; selected comparative and veterinary examples of different immune recognition systems; evolution of the immune system. 
Prerequisites: Junior or senior classification, GENE 320/BIMS 320 and VTPB 409 or approval of instructor.

VTPB 421 Bacterial Diseases of Humans and Animals  
Credits 3. 3 Lecture Hours.  
Pathogenesis of selected bacterial pathogens of humans and animals; bacterial virulence factors, host immune responses; current concepts of extracellular, facultative intracellular and obligate intracellular bacterial diseases. 
Prerequisites: VTPB 405 and VTPB 409; junior or senior classification.

VTPB 438 Biomedical Virology  
Credits 3. 3 Lecture Hours.  
Fundamental study of nature and characteristics of human and animal viruses; classification, morphology, chemical structure, ability to cause disease and nature of resulting disease. 
Prerequisite: 3 hours of microbiology or approval of instructor.

VTPB 452 Clinical Veterinary Mycology  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Practical application of clinical mycology; laboratory identification of important fungal and actinomycotic organisms. 
Prerequisites: Junior or senior classification; VTPB 405 or approval of instructor.

VTPB 454/MARB 454 Ornamental Fish Health Management  
Credits 3. 3 Lecture Hours.  
Maintenance and health care of ornamental fish in closed recirculating systems; aquariotherapy, anatomy and physiology, nutrition, immunology, infectious and noninfectious diseases, checklists, quarantine procedures and health maintenance of ornamental fish. 
Prerequisites: VTPB 405 or BIOL 351; BICH 410 or MARS 360; junior or senior classification. 
Cross Listing: MARB 454.

VTPB 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Directed individual study of selected problems in microbiology, parasitology, immunology, genetics or pathology as approved by instructor. 
Prerequisites: Approval of department head; junior or senior classification.

VTPB 487/BIOL 487 Biomedical Parasitology  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Helminth and protozoan parasites of medical and veterinary importance; life cycles, morphology, taxonomic classification, economic and public health aspects and current topics in parasitic diseases. 
Prerequisites: BIOL 107 or BIOL 114; junior classification or approval of instructor. 
Cross Listing: BIOL 487/VTPB 487.
VTPB 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of microbiology, pathology, genetics, immunology, parasitology, or physiological chemistry. May be repeated for credit.
Prerequisites: Junior or senior classification and approval of department head.

VTPP - Vet Physiology & Pharm (VTPP)

VTPP 123 Foundations of Physiology
Credits 3. 3 Lecture Hours.
Introduction to fundamental concepts in physiology and the practice of physiology research through exploration of mathematical models used in physiology research; emphasis on prediction of complex adaptive behavior in health and disease from elementary math, physics, chemistry and biology.

VTPP 223 Design of Experiments for Physiology Research
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Team or group formulation and refinement of novel hypotheses and design of controlled in vitro experiments; emphasis on production of publishable research in physiology.
Prerequisite: VTPP 123 or approval of instructor.

VTPP 224 In Vitro Experimentation in Physiology Research
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Team or group collection, analysis and interpretation of data from in vitro experiments; emphasis on production of publishable research in physiology.
Prerequisite: VTPP 223 or approval of instructor.

VTPP 234 Design of Models for Physiology Research
Credits 3. 3 Lecture Hours.
Team or group design of novel models of physiological systems to predict homeostatic behavior arising from the interaction of subsystems; emphasis on production and formal presentation of basic research in physiology.
Prerequisite: VTPP 123 or approval of instructor.

VTPP 235 Analysis and Validation of Models for Physiology Research
Credits 3. 3 Lecture Hours.
Team or group analysis and validation of models of physiological systems to explain disease states and design potential clinical interventions; emphasis on production of publishable applied research in physiology.
Prerequisite: VTPP 234 or approval of instructor.

VTPP 281 Seminar
Credits 4. 4 Other Hours.
Exposure to scientists from a variety of biomedical disciplines through attendance at seminars followed by review and discussion of current scientific work in physiology and related subjects, and subsequent student seminar presentations.
Prerequisites: Freshman or sophomore classification; approval of instructor.

VTPP 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Course for freshman and sophomore students who desire additional laboratory work in physiology to supplement required courses.
Prerequisites: Freshman or sophomore classification; approval of department head.

VTPP 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of veterinary physiology and pharmacology. May be repeated for credit.

VTPP 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Laboratory and/or field research supervised by a faculty member. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Freshman or sophomore classification; approval of instructor.

VTPP 323 Physiology of Domestic Animals
Credits 3. 3 Lecture Hours.
Physiology essential to understanding of life processes. For students in agriculture and related fields.
Prerequisite: Junior classification.

VTPP 401 History of Human and Veterinary Medicine in Europe
Credits 4. 4 Lecture Hours.
Addresses the major developments in human and veterinary medicine in Europe from the Middle Ages to the present; explores key events and figures in medical history and analyzes issues of current biomedical concern in an historical context; for example, animal rights, ethics of human experimentation, euthanasia.

VTPP 423 Biomedical Physiology I
Credits 4. 3 Lecture Hours. 2 Lab Hours.
Physiological principles, review of cellular physiology, and development of an understanding of the nervous system and muscle, cardiovascular, and respiratory physiology; clinical applications related to organ systems.
Prerequisites: VIBS 305; junior or senior classification.

VTPP 424/VIBS 424 Biomedical Neuroendocrinology and Endocrine Disorders
Credits 3. 3 Lecture Hours.
Neuroendocrine (hypothalamus-pituitary) control of puberty, menstruation, ovulation, pregnancy, labor, lactation, female reproductive cycles, male reproductive functions, thyroid and parathyroid, adrenal and kidney, diabetes, obesity, sleep, memory, learning and aging and their endocrine disorders; overview of biosynthesis, transport and signaling of peptide and neuropeptide hormones, steroids and prostaglandins.
Prerequisites: Honors, junior or senior classification, or approval of instructor.
Cross Listing: VIBS 424/VTPP 424.

VTPP 425 Pharmacology
Credits 3. 3 Lecture Hours.
Introduction to pharmacokinetics and pharmacodynamics; survey of major pharmaceutical classes; uses, mechanisms of action and adverse reactions of selected agents.
Prerequisites: VTPP 423 or approval of instructor; junior or senior classification.

VTPP 427 Biomedical Physiology II
Credits 3. 3 Lecture Hours.
Continuation of VTPP 423. Fluid balance and acid-base balance; development of an understanding of renal, gastrointestinal, endocrine and reproductive physiology using human and other mammalian models; clinical applications related to organ systems.
Prerequisites: VTPP 423; junior or senior classification.
VTTP 429 Introduction to Toxicology
Credits 3. 3 Lecture Hours.
An overview of toxicology with emphasis on environmental, human and animal health issues.
Prerequisite: Junior or senior classification.

VTTP 434 Physiology for Bioengineers I
Credits 4. 3 Lecture Hours. 1 Lab Hour.
Cellular anatomy, cellular physiology and biochemistry; systems analysis of digestive, endocrine and musculoskeletal system function including information related to gross anatomy, histology and disease states; quantitative aspects of physiology and engineering applications to clinical medicine.
Prerequisites: Junior or senior classification; biomedical engineering major or approval of instructor.

VTTP 435 Physiology for Bioengineers II
Credits 4. 3 Lecture Hours. 1 Lab Hour.
A systems analysis of nervous, cardiovascular, respiratory and urinary function including information related to gross anatomy, histology and disease states; quantitative aspects of physiology and engineering applications to clinical medicine.
Prerequisites: VTTP 434; junior or senior classification.

VTTP 438 Analysis of Genomic Signals
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Overview of current high throughput technology for data acquisition and analysis of genomic signals (e.g. mRNA or proteins); emphasis on the microarray technology, methods for analyzing microarray data, and approaches to model the underlying phenomena from the systems biology perspective.
Prerequisites: Junior or senior classification; BIMS 320/GENE 320 or GENE 320/BIMS 320 and BIOL 111, BIOL 112 or BIOL 213 or equivalent; STAT 302 or equivalent.

VTTP 439 Non-Coding RNA’s
Credits 3. 3 Lecture Hours.
Advanced topics in noncoding RNA’s in gene regulation; investigation of the role of noncoding RNAs and epigenetic regulatory factors in modulating gene expression, physiological functions and disease development.
Prerequisite: Junior or senior classification or approval of instructor.

VTTP 444 Practicum in Biomedical Research
Credits 3. 3 Other Hours.
Team or group development of sustainable collaborations that include biomedical research, high-impact educational practices and community service; focus on connecting research experience to future career goals.
Prerequisites: VTTP 423 and VTTP 427 or VTTP 434 and VTTP 435; junior or senior classification.

VTTP 450 Stem Cell Physiology
Credits 3. 3 Lecture Hours.
Advanced topics in stem cell biology; exploration of mammalian stem cells, stem cell characteristics, cell differentiation potency, molecular basis of stem cell signaling, regulatory pathways, research tools and experimental models.
Prerequisite: Junior or senior classification or approval of instructor.

VTTP 452 Fetal and Embryo Physiology
Credits 3. 3 Lecture Hours.
Introduction to the physiologic processes driving embryonic development and pregnancy; focus on embryo implantation, establishment of the placenta, development of the fetal circulatory systems and the molecular processes governing embryo differentiation and development; special emphasis on the major organ systems affected by pediatric disease and on the actions of teratogens.
Prerequisite: BICH 410 or equivalent, or approval of instructor.

VTTP 481 Seminar
Credits 4. 4 Other Hours.
Exposure to scientists from a variety of biomedical disciplines through attendance at seminars followed by review and discussion of current scientific work in physiology and related subjects, and subsequent student seminar presentations.
Prerequisites: Junior or senior classification; approval of instructor.

VTTP 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Course for junior and senior students who desire additional laboratory work in physiology to supplement required courses.
Prerequisites: Junior or senior classification and approval of department head.

VTTP 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of physiology, pharmacology, endocrinology or toxicology. May be repeated for credit.
Prerequisite: Junior or senior classification.

WFSC-Wildlife & Fisheries Sci (WFSC)

WFSC 101 Introduction to Wildlife and Fisheries
Credit 1. 1 Lecture Hour.
Introduction to the wildlife and fisheries profession and to alternatives for study in the department.
Prerequisite: Open only to students with less than 36 hours at Texas A&M University. Registration through the Department of Wildlife and Fisheries Sciences only.

WFSC 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Laboratory and/or field research supervised by a faculty member.
Prerequisites: Junior or senior classification; approval of instructor.

WFSC-Wildlife & Fisheries Sci (WFSC)

WFSC 300/ENTO 300 Field Studies
Credits 3. 3 Other Hours.
Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations. Intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey.
Prerequisite: Prior approval of instructor.
Cross Listing: ENTO 300/WFSC 300.
WFSC 301 Wildlife and the Changing Environment
Credits 3. 3 Lecture Hours.
Using an ecosystem approach, analyzes changes in the North American environment; effects of these changes on wildlife populations; and reviews areas of major, current concern.
Prerequisites: Junior or senior classification; restricted to non-majors.

WFSC 302 Natural History of the Vertebrates
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Introduction to life histories of fishes, amphibians, reptiles, birds and mammals; lecture covers vertebrate groups on a worldwide scale and emphasizes a comparative approach to the study of adaptation to the environment; lecture topics include behavior, reproduction, feeding specializations, evolutionary history, locomotion, hibernation, migration, endangered species, zoogeography and importance to man; laboratory emphasizes the recognition of Texas vertebrates. Designed for both science and non-science majors.
Prerequisites: BIOL 111 and BIOL 112 or BIOL 101 and BIOL 107 or equivalent.

WFSC 303 Fish and Wildlife Laws and Administration
Credits 3. 3 Lecture Hours.
Review and analysis of state and federal laws and international treaties and conventions affecting fish and wildlife; their application and administration; organizational structure of state, federal and international agencies; their objectives, policies and practices.
Prerequisites: RENR 205 or BIOL 357; junior classification.

WFSC 304 Wildlife and Fisheries Conservation
Credits 3. 3 Lecture Hours.
Ecological principles used to conserve and manage wildlife and fisheries resources at the individual, population and community levels; topics include conservation biology, species interactions, animal-habitat relationships, population dynamics and harvesting, habitat management and restoration and human dimensions of fish and wildlife conservation.
Prerequisites: RENR 205 and junior or senior classification or approval of instructor.

WFSC 311 Ichthyology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to the study of fishes, their biology, classification, evolution, distribution, ecology and economic importance.
Prerequisite: WFSC 302 or BIOL 318.

WFSC 314 Down River: Biology of Gulf Coastal Fishes
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Understanding the biological complexity of Gulf coast river systems while gaining hands-on experience in field and museum ichthyological techniques; sampling of the Guadalupe and San Antonio rivers; participation in lectures, museum preparation and archiving specimens at the Biodiversity Research and Teaching Collections (BRTC).
Prerequisites: WFSC 311 with a grade of B or better and approval of instructor.

WFSC 315 Herpetology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Evolutionary ecology of reptiles and amphibians and conservation biology of the major groups; labs concentrate on the global diversity of herps and the herpetofauna of Texas; foundation for students in wildlife science and biology.
Prerequisites: WFSC 302 or approval of instructor; WFSC 302 or BIOL 318.

WFSC 316 Field Herpetology
Credit 1. 3 Lab Hours.
Field work involving collection and preservation of herpetological specimens; natural history, ecological relations. Available for students enrolled in WFSC 315 who would like to have field trips.
Prerequisite: WFSC 315 or registration therein.

WFSC 327/VTPB 301 Wildlife Diseases
Credits 3. 3 Lecture Hours.
Basic mechanisms of diseases as they occur in wildlife populations; interplay of habitat requirements, individual physiological requirements and disease producing mechanisms of varied wildlife species.
Prerequisite: Junior classification or approval of department head.
Cross Listing: VTPB 301/WFSC 327.

WFSC 335 Natural History of the Invertebrates
Credits 4. 3 Lecture Hours. 3 Lab Hours.
A phylogenetic survey of the invertebrate phyla including their taxonomy, morphology, life histories, ecology, ethology and zoogeography. Field trips may be required for which departmental fees may be assessed to cover costs.

WFSC 401 General Mammalogy
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Mammalian biology; evolution, classification, biogeography, reproduction, physiology, ecology, and behavior; focuses on basic concepts necessary for a foundation in both wildlife science and biology.
Prerequisites: WFSC 302 or BIOL 318; junior classification.

WFSC 402 General Ornithology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to study of birds, their structure, classification, geographic distribution, ecological relations and economic status; foundation of wildlife science, also for museum work.
Prerequisites: WFSC 302 or BIOL 318; junior classification.

WFSC 403 Animal Ecology
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Concepts of animal ecology which emerge at various levels of organization; the ecosystem, the community, the population and the individual; laboratories emphasis on the quantitative analysis of field data and the simulation of population dynamics.
Prerequisites: WFSC 201 and RENR 205 or approval of instructor; junior classification.

WFSC 404 Aquatic Ecosystems
Credits 3. 3 Lecture Hours.
Inland and coastal zone aquatic ecosystems, lower foodweb structure, functioning and influence on living resources; lakes, rivers, estuaries, open bay systems, factors impacting ecosystem health and fisheries; harmful algal blooms, reduced water inflows, eutrophication and hypoxia formation as they affect foodwebs, recruitment of commercially and recreationally important fisheries.
Prerequisite: Junior or senior classification or approval of instructor.

WFSC 405 Urban Wildlife and Fisheries
Credits 3. 3 Lecture Hours.
Urban wildlife and fisheries trains students to establish and maintain diverse, self-sustaining urban wildlife and fish populations at levels in harmony with ecological, social, and economic values of the human community and to develop optimal levels of public appreciation and use of urban wildlife and fish resources and associated habitats.
Prerequisites: RENR 205; junior or senior classification.
WFSC 406 Wildlife Habitat Management  
**Credits 3. 3 Lecture Hours.**  
Designed to acquaint the student with major land use practices on lands that produce wildlife, how these influence wildlife production and alterations or manipulations of habitat used to achieve specific wildlife management goals.  
**Prerequisites:** WFSC 201 and WFSC 403; WFSC 401 or WFSC 402; senior classification; wildlife and fisheries sciences major or approval of instructor; concurrent registration in WFSC 407 required.

WFSC 407 Field Wildlife Habitat Management  
**Credit 1. 2 Lab Hours.**  
Field and laboratory studies of specific wildlife habitat management practices with special emphasis on those used in Texas; attendance required at four weekend field trips to study wildlife habitat operations.  
**Prerequisite:** Concurrent registration in WFSC 406 required.

WFSC 408 Techniques of Wildlife Management  
**Credits 3. 2 Lecture Hours. 3 Lab Hours.**  
Techniques available to directly and indirectly manipulate wild animal populations to achieve balance between socioeconomic and aesthetic values.  
**Prerequisites:** Senior classification; WFSC 403 and WFSC 406 or registration therein or approval of instructor.

WFSC 409 NATURE in the Classroom: Needed Activities To Understand Resource Ecology  
**Credit 1. 3 Lab Hours.**  
Integration of natural resources through conservation ecology programs, utilization of research techniques adaptable for classroom use; field trips to community facilities, gaming strategies and computer simulations.  
**Prerequisites:** WFSC 420 or RENR 205 or concurrent enrollment; junior or senior classification.

WFSC 410 Principles of Fisheries Management  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**  
Basic knowledge from ichthyology, biology of fishes and limnology related to applied aspects of freshwater and marine fishery science. Management techniques applicable to streams, ponds, reservoirs, estuaries and the oceans.  
**Prerequisites:** WFSC 311 and WFSC 414; STAT 302 or concurrent enrollment; or approval of instructor.

WFSC 414 Ecology of Lakes and Rivers  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**  
Biological, physical, chemical and geological characteristics of fresh waters; human impacts, which include influence of industrial, domestic, conservation and restoration activities.  
**Prerequisites:** CHEM 101 and CHEM 222; PHYS 201; junior or senior classification.

WFSC 417 Biology of Fishes  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**  
Fishes' physiological and morphological adaptations for life in aquatic systems; physiological and behavioral responses of fish to environmental variation. Laboratory emphasizes design, conduct and analysis of virtual experiments featuring "EcoFish," a simulation model of fish autecology.  
**Prerequisites:** WFSC 302 or WFSC 311; WFSC 414; or approval of instructor.

WFSC 418 Ecology of the Coastal Zone  
**Credits 3. 3 Lecture Hours.**  
Introduction to the ecosystems that comprise the coastal zone with an emphasis on the role of freshwater inflows; open bay systems are the focus of lectures, but fringing habitats are also discussed; human components of the coastal zone are also discussed including industrial, commercial domestic, conservation and restoration issues.  
**Prerequisite:** Junior or senior classification.

WFSC 419 Wildlife Restoration  
**Credits 3. 2 Lecture Hours. 3 Lab Hours.**  
Study of the fundamentals of the restoration of animal populations and the resources they require; factors that control the distribution and abundances of animals in relation to restoration; and how restoration plans for wildlife are developed.  
**Prerequisite:** RENR 205 or equivalent; junior or senior classification or approval of instructor; WFSC 406 and WFSC 407 and ESSM 320 preferred.

WFSC 420 Ecology and Society  
**Credits 3. 3 Lecture Hours.**  
Study and compare human and natural ecosystems using diversity, interrelations, cycles, and energy as the conceptional organization; central themes are sustainability, stewardship and science.  
**Prerequisite:** Junior or senior classification.

WFSC 422 Ethology  
**Credits 3. 3 Lecture Hours.**  
Survey of the control, ontogeny, function and natural selection of behavior in a variety of vertebrate and invertebrate species; interaction between the organism and its environment with regard to the mechanisms and adaptive significance of behavior; evolution of anti-predator, feeding, reproductive and cooperative traits.  
**Prerequisite:** BIOL 112 or equivalent.

WFSC 425 Marine Fisheries  
**Credits 3. 3 Lecture Hours.**  
Survey of fisheries for marine vertebrates and invertebrates primarily in the Gulf of Mexico and South Atlantic with special emphasis being directed to their biology, economics and management.

WFSC 426/MARB 426 Aquatic Animal Nutrition  
**Credits 3. 3 Lecture Hours.**  
Chemistry, digestion, absorption and intermediary metabolism of nutrient classes with special emphasis on their relationship to warmwater fish nutrition; determination of nutrient requirements, feed evaluation, feed processing, ration formulation and feeding practices.  
**Prerequisites:** CHEM 222; CHEM 227 or equivalent. Taught even years.  
**Cross Listing:** MARB 426.

WFSC 427 Disease Management in Fisheries and Aquaculture  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**  
Fish and invertebrates of economic importance; factors influencing the maintenance of health for each species group; problems and solutions unique to each phase of aquaculture from breeding to growout; application of routine diagnosis and other management tools.  
**Prerequisite:** Junior classification.
WFSC 428 Wetland Ecosystem Management
Credit 4. 3 Lecture Hours. 3 Lab Hours.
Ecosystem approach to the ecology and management of wetlands; emphasis on factors controlling wetland structure and function, characteristics of different wetland types, and applied issues of wetland restoration, creation and delineation.
Prerequisite: Junior or senior classification.

WFSC 433 Molecular Ecology in Wildlife and Fisheries
Credit 3. 3 Lecture Hours.
Fundamentals of molecular ecology applied to conservation and management of wildlife and fisheries; presentation and discussion of scientific papers on wildlife and fisheries molecular ecology; topics in conservation, management and aquaculture.
Prerequisites: BIOL 112 or equivalent; junior or senior classification.

WFSC 444 Aquaculture I: Principles and Practices
Credit 4. 3 Lecture Hours. 3 Lab Hours.
Scientific perspectives concerning major principles associated with fish production under controlled conditions; production techniques associated with prominent species produced via aquaculture throughout the world with emphasis on those cultured in the United States.
Prerequisite: Junior or senior classification or approval of instructor.

WFSC 447 Aquaculture II: Aquatic Animal Nutrition, Feeding and Disease Management
Credit 4. 3 Lecture Hours. 3 Lab Hours.
Review of scientific perspectives on major aspects of nutrition, diet formulation and feeding of aquatic species in aquaculture; major disease-causing organisms encountered in aquaculture and means of disease prevention and control.
Prerequisite: Junior or senior classification or approval of instructor.

WFSC 448 Fish Ecophysiology
Credit 3. 3 Lecture Hours.
Ecological domains and demands placed on physiological performance; physiological mechanisms and control in fishes, interaction of physiological mechanisms with environment, emphasis in adaptive value of physiological traits; analysis of physiology and adaptation with models; process and functional modeling.
Prerequisite: WFSC 311 or concurrent enrollment, junior or senior classification or approval of instructor.

WFSC 449 Professional Aspects of Aquatic Ecology
Credit 3. 3 Lecture Hours.
Discipline of aquatic sciences through oral presentation and written documentation; job market expectations, resume preparation, job application, and preparation for and giving an interview.
Prerequisite: Junior or senior classification or approval of instructor.

WFSC 450/ENTO 450 Caribbean Conservation
Credit 2. 6 Lab Hours.
Provide experience in and appreciation for diverse tropical habitats and the problems associated with conserving these habitats; design and conduct individual research projects on topics of their choice with approval from the instructors on project design and feasibility.
Prerequisites: Concurrent enrollment in ENTO 300/WFSC 300 and ENTO 451/WFSC 451; junior or senior classification.
Cross Listing: ENTO 450/WFSC 450.

WFSC 451/ENTO 451 Caribbean Research Seminar
Credit 1. 1 Other Hour.
Document research activities; keep a journal of activities and research methods during study abroad trips.
Prerequisites: Concurrent enrollment in ENTO 300/WFSC 300 and ENTO 450/WFSC 450; junior or senior classification.

WFSC 454 Amazon Field School
Credit 4. 4 Lecture Hours.
Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences and solutions to biodiversity loss through ecology, culture and governance.
Prerequisites: Junior or senior classification with a minimum GPA of 2.0 and approval of instructor.
Cross Listing: RPTS 454 and VTPB 404.

WFSC 462/BIOL 462 Amazon River Tropical Biology
Credit 3. 3 Lecture Hours.
History, ecology, evolution and biology, geography, and culture of the Amazon River and Rio Negro; exploration of the world’s most bio-diverse river during a 10-day expedition from Manaus, Brazil; survey biota, record observations about the ecosystem, select research topics, development of presentations.
Prerequisites: BIOL 107, BIOL 112, BIOL 113, BIOL 357 or RENR 205; or approval of instructor.
Cross Listing: BIOL 462/WFSC 462.

WFSC 481 Seminar
Credit 1. 1 Lecture Hour.
Oral discussion of selected topics from technical literature on recent advances in the field.
Prerequisites: Senior classification in wildlife and fisheries sciences; 6 hours of 300- or 400-level wildlife and fisheries sciences courses. May be repeated for credit.

WFSC 484 Internship
Credit 1 to 9. 1 to 9 Other Hours.
Practical experience working in a professional wildlife or fisheries facility.
Prerequisite: Approval of department head.

WFSC 485 Directed Studies
Credit 1 to 3. 1 to 3 Other Hours.
Individual study and research on selected problem approved by instructor and academic advisor.
Prerequisites: Junior or senior classification; approval of department head.

WFSC 489 Special Topics in...
Credit 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of wildlife and fisheries sciences. May be repeated for credit.
Prerequisite: Approval of department head.

WFSC 491 Research
Credit 1 to 6. 1 to 6 Other Hours.
Laboratory and/or field research supervised by a faculty member in wildlife and fisheries sciences. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.
Prerequisites: Junior or senior classification; approval of instructor.
WGST - Women's & Gender Studies (WGST)

WGST 200 Introduction to Women's and Gender Studies
Credits 3. 3 Lecture Hours.
Historical and cross-cultural perspectives on women's roles in culture, the workplace, the family and other socio-political institutions; the social construction of gender; sexuality and racism; social control mechanisms and ideologies.

WGST 207/SOCI 207 Introduction to Gender and Society
Credits 3. 3 Lecture Hours.
Similarities and differences between females and males in a number of cultures throughout the world; sociological analysis of gender in relation to social structure.
Cross Listing: SOCI 207/WGST 207.

WGST 285 Directed Studies
Credits 0 to 3. 0 to 3 Other Hours.
Readings and/or research for specific needs of students majoring or minoring in women's and gender studies.
Prerequisites: Approval of women's and gender studies director and faculty supervisor.

WGST 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of women's/gender studies. May be repeated for credit.
Prerequisite: Approval of director.

WGST 291 Research
Credits 0 to 3. 0 to 3 Other Hours.
Research conducted under the direction of faculty member in women's and gender studies. May be taken four times for credit.
Prerequisites: 3 credits in WGST; freshman or sophomore classification and approval of instructor.

WGST 300/PSYC 300 Psychology of Women
Credits 3. 3 Lecture Hours.
Theoretical and research literature relevant to psychological assumptions about the female personality; challenges to and verification of these assumptions by recent experimental studies.
Prerequisite: PSYC 107.
Cross Listing: PSYC 300/WGST 300.

WGST 302 Women and Religion
Credits 3. 3 Lecture Hours.
Investigation of women's position in religious institutions historically and/or currently, religion's influence on women's roles and status, and women's attempts to define their own religious perspectives; draws on sociological and philosophical insights and methods.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: RELS 302 and SOCI 302.

WGST 303 Psychology of Women of Color
Credits 3. 3 Lecture Hours.
Interdisciplinary theories to study the unique yet intersectional experiences of women from different racial groups, ethnicities, nationalities and cultural backgrounds; scholarly research from the diversity science field; contemporary topics that have developed in a global context; examination of complex issues, which affect women of color across the lifespan.
Prerequisite: Grade of C or better in AFST 201 or PSYC 107 or WGST 200, or approval of instructor.
Cross Listing: AFST 303 and PSYC 303.

WGST 307 Gender and Education
Credits 3. 3 Lecture Hours.
Overview of gender and education; role of feminism and feminist theory; intersections of gender, race, class, ethnicity, and sexuality.
Prerequisite: Junior or senior classification.

WGST 308 Gender and International Education
Credits 3. 3 Lecture Hours.
Exploration of the intersection of formal and informal education and understandings of gender in countries beyond the United States.
Prerequisites: WGST 307; junior or senior classification.

WGST 310 Feminist Pedagogy
Credits 3. 3 Lecture Hours.
Exploration of educational systems' and institutions' regard for women historically and contemporarily; practical and theoretical writings on feminist pedagogy.
Prerequisites: WGST 307; junior or senior classification.

WGST 311/PSYC 311 Motherhood in Society
Credits 3. 3 Lecture Hours.
Examines expectations and/or practices relating to motherhood, with consideration of their cultural impact; taught from a social science perspective.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: SOCI 310/WGST 311.

WGST 315/SOCI 315 The Marriage Institution
Credits 3. 3 Lecture Hours.
Courtship, engagement, marriage, family formation, personal adjustment, conflict, financing and child rearing.
Prerequisite: Junior or senior classification.
Cross Listing: SOCI 315/WGST 315.

WGST 316/SOCI 316 Sociology of Gender
Credits 3. 3 Lecture Hours.
Sociological explanations of status differences between men and women; cross-cultural comparisons; gender role socialization, cultural stereotypes, discrimination; gender roles and status in the family, economy, religion, science, other social institutions; deviance, victimization and gender; recent social changes.
Cross Listing: SOCI 316/WGST 316.

WGST 317/POLS 317 Women in Politics
Credits 3. 3 Lecture Hours.
Role of women in the political system; treatment of women in political theory; effect of law on women's status; women as political leaders; current policy issues of concern to women.
Prerequisite: POLS 206.
Cross Listing: POLS 317/WGST 317.

WGST 318/ECON 318 The Economics of Gender and Race
Credits 3. 3 Lecture Hours.
Theories and evidence on gender and race differences in labor market outcomes; labor supply and the role of family formation; the effect of human capital and discrimination on earnings; analysis of government policies; international comparisons.
Prerequisites: 6 hours from ECON 202, STAT 303, 3 hours in WGST above 200 level; junior or senior classification.
Cross Listing: ECON 318/WGST 318.
WGST 330 Women in Ancient Greece and Rome
Credits 3. 3 Lecture Hours.
Survey of women in classical Greece and Rome; emphasizes on female occupations and family relationships, legal and political status, traditional values, notorious women, how women were viewed and how they viewed themselves.
Prerequisite: Junior or senior classification.
Cross Listing: CLAS 330 and HIST 330.

WGST 332/SOCI 332 Alternative Genders
Credits 3. 3 Lecture Hours.
Examination of theories and case studies involving alternative genders and sexualities, studied in their cultural contexts and including the role of factors such as race, class, ethnicity, age, and physical characteristics.
Prerequisites: 3 credits in SOCI or WGST; junior or senior classification.
Cross Listing: SOCI 332/WGST 332.

WGST 333/ENGL 333 Gay and Lesbian Literature
Credits 3. 3 Lecture Hours.
Gay and lesbian literature from classical times to present, studied in its historical and cultural context.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 333/WGST 333.

WGST 334/HLTH 334 Women's Health
Credits 3. 3 Lecture Hours.
A broad range of health issues that are either unique to women or of special importance to women; information for the health consumer; preparation as an advocate of healthy lifestyles; awareness of the role health plays in the life of all women.
Prerequisite: Junior or senior classification.
Cross Listing: HLTH 334/WGST 334.

WGST 343/FILM 343 Sex, Gender and Cinema
Credits 3. 3 Lecture Hours.
Exploration of a significant topic at the intersection of women's/ gender studies and film, such as cinema and sexuality studies, cinema and women, and cinema and masculinity; may include discussion of production, film content, and/or reception.
Prerequisites: 3 hours in FILM or WGST; junior or senior classification or approval of instructor.
Cross Listing: FILM 343/WGST 343.

WGST 367/POLS 367 Women in Government in Comparative Perspective
Credits 3. 3 Lecture Hours.
Examination of women's representation in government based on comparison across multiple nation-states; focus on legislative and executive branches of democratic governments.
Prerequisites: POLS 206; junior or senior classification or approval of political science department head.
Cross Listing: POLS 367/WGST 367.

WGST 374/ENGL 374 Women Writers
Credits 3. 3 Lecture Hours.
History of literature by women in English; emphasis on continuity of ideas and on literary contributions; study of a variety of genres with particular attention to the significance of gender in the racial, social, sexual and cultural contexts of women writing in English.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 374/WGST 374.

WGST 391 Studies in Gender and Diversity
Credits 3. 3 Lecture Hours.
 Exploration of a significant topic in gender studies, emphasizing the interplay of gender with one or more races, ethnicities, and/or cultures beyond the Anglo-American.
Prerequisite: Junior or senior classification.

WGST 401 Feminist Theory
Credits 3. 3 Lecture Hours.
Inquiry-based examination of feminist theory from various periods and disciplinary perspectives, with application to societal debates and controversies.
Prerequisites: WGST 200 or approval of instructor; junior or senior classification.

WGST 403 Language and Gender
Credits 3. 3 Lecture Hours.
Language and gender from a sociolinguistic perspective; gender in the words and structures of language; gender representation and gendered language use in the media, and a variety of sociocultural contexts; language use in intimate relationships; computer-mediated discourse; language, sexuality, and sexual orientation.
Prerequisite: Junior or senior classification.
Cross Listing: ENGL 403 and LING 403.

WGST 404/ANTH 404 Women and Culture
Credits 3. 3 Lecture Hours.
Examines women's lives in evolutionary and cross-cultural perspective; women's roles in subsistence, politics, religion and economics in traditional cultures; women's roles in international development; the cultural and social construction of women's biology cross-culturally including circumcision, menstruation, pregnancy, childbirth and motherhood.
Cross Listing: ANTH 404/WGST 404.

WGST 407/COMM 407 Women, Minorities and the Mass Media
Credits 3. 3 Lecture Hours.
The contributions of women and ethnic groups to the evolution of the media; the portrayal of women and ethnic groups in the mass media; issues resulting from the recognition of women and ethnic groups as media audiences.
Prerequisite: Junior classification or approval of instructor.

WGST 409/PHIL 409 Studies in Gender and Philosophy
Credits 3. 3 Lecture Hours.
Analysis, from a gender-studies perspective, of a single figure or concept in the history of philosophy. May be repeated 1 time for credit with a different focus.
Prerequisites: 3 hours in philosophy and women's and gender studies; junior or senior classification.
Cross Listing: PHIL 409/WGST 409.

WGST 410/SOCI 410 Reproduction, Birth and Power
Credits 3. 3 Lecture Hours.
Examination of topics related to reproductive practices, experiences and ideologies and of the constructed and contested meanings surrounding womanhood, motherhood, sexuality, reproductive freedom and eugenics.
Prerequisites: SOCI 205; junior or senior classification.
Cross Listing: SOCI 410/WGST 410.
WGST 411/COMM 411 Representations of Motherhood
Credits 3. 3 Lecture Hours.
Examination of understandings of motherhood from a humanities perspective and over a variety of cultures and time periods, as reflected in written, media and/or oral texts.
Prerequisites: Junior or senior classification or approval of instructor.
Cross Listing: COMM 411/WGST 411.

WGST 420/COMM 420 Gender and Communication
Credits 3. 3 Lecture Hours.
Survey of the role of gender in communication processes; focus on communication differences between men and women in contexts such as the family, school and work organizations; discussion of media influence in gender stereotypes.
Cross Listing: COMM 420/WGST 420.

WGST 422/FREN 422 Studies in Gender and French Literature
Credits 3. 3 Lecture Hours.
The role of gender in production, dissemination, reception and interpretation of literary texts in the French tradition, including continental France as well as the Francophone literatures of West Africa, Canada, and elsewhere; taught in English.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: FREN 422/WGST 422.

WGST 424/SOCI 424 Women and Work in Society
Credits 3. 3 Lecture Hours.
Social context of women's work; work patterns, labor force participation, occupational destinations and occupational mobility; alternatives to the conventional division of labor by sex in society.
Cross Listing: SOCI 424/WGST 424.

WGST 428/COMM 428 Women's Rhetoric
Credits 3. 3 Lecture Hours.
Examination of the historical imbrication of masculinity and rhetoric in relation to women's participation in political life, reception of women's rhetoric in the public sphere, and remembrance and representation of women as rhetorical agents throughout history; consideration of women's rhetoric in various cultural arenas.
Prerequisite: Junior or senior classification.
Cross Listing: COMM 428/WGST 428.

WGST 430/MGMT 430 Employment Discrimination Law
Credits 3. 3 Lecture Hours.
Legal issues surrounding employment discrimination, including disparate treatment and impact; intent; affirmative action; sexual harassment; pregnancy, sex, race, religious, salary, disability, age, and ethnic discrimination; policy issues and perspectives to aid human resource specialists and managers.
Prerequisite: Senior classification.
Cross Listing: MGMT 430/WGST 430.

WGST 439/ANTH 439 Gender, Ethnicity and Class in Archaeological Research
Credits 3. 3 Lecture Hours.
Exploration of theoretical and methodological issues in engendering archaeology; ideological biases in interpretations of roles attributed to women, men, and underrepresented groups in the past; the impact of cultural transformation on underrepresented groups and gender relations; and the formulation of research questions concerning these issues.
Prerequisites: ANTH 202, ANTH 210, WGST 200 or WGST 207/SOCI 207; junior or senior classification or approval of instructor.
Cross Listing: ANTH 439/WGST 439.

WGST 445 Queer Theory
Credits 3. 3 Lecture Hours.
Examines origins of theories of gender and sexual diversity and their intersections with feminist theories; considers foundational and contemporary texts that address queer theory.
Prerequisites: 6 hours in Women's and Gender Studies; senior classification or approval of instructor.

WGST 452/ITAL 452 Women and Gender in Italy
Credits 3. 3 Lecture Hours.
The historical and cultural dynamics forging the notion of woman and gender in Italian society and cultural production; discussion of cultural works, media and theoretical texts concerning subjectivity and language, body and culture; taught in English.
Prerequisite: ITAL 201 or concurrent enrollment or approval of instructor.
Cross Listing: ITAL 452/WGST 452.

WGST 461/HIST 461 History of American Women
Credits 3. 3 Lecture Hours.
Cultural, political, legal and religious factors that helped shape the role and character of women in American society from colonial times to the present; historical role of women in the development of the nation.
Cross Listing: HIST 461/WGST 461.

WGST 462/POLS 462 Women and the Law
Credits 3. 3 Lecture Hours.
The legal status of American women from the adoption of the Constitution to the present: constitutional developments; the 19th Amendment and the proposed Equal Rights Amendment; employment; family law; reproductive rights; education; sexual equality in context of other claims to equality; law and social norms.
Prerequisite: POLS 206 or approval of department head.
Cross Listing: POLS 462/WGST 462.

WGST 463 Gender in Asia
Credits 3. 3 Lecture Hours.
Gender dynamics in Asia; changes in gender roles; women's movements; women and the economy; women and politics; men's and women's private lives.
Prerequisite: Junior or senior classification or approval of instructor.
Cross Listing: ASIA 463 and SOCI 463.

WGST 473/HIST 473 History of Modern American Women
Credits 3. 3 Lecture Hours.
Emergence of modern American women in the 1890s; examination of their history from the 1890s to the present; women as organizers, innovators, political reformers, workers, social activists, housewives, mothers, consumers and feminists.
Cross Listing: HIST 473/WGST 473.

WGST 474/ENGL 474 Studies in Women Writers
Credits 3. 3 Lecture Hours.
A different topic each term examining women's writing through historical period, genre, cross-cultural study and/or feminist literary theory. May be repeated for credit.
Prerequisites: 3 credits of literature at the 300-level; junior or senior classification.
Cross Listing: ENGL 474/WGST 474.
WGST 476/HIST 476 Sex and Sexuality in History
Credits 3. 3 Lecture Hours.
Changing ideas about sex and sexuality over time; includes their interaction with ideas about gender, race, class, religion, science, technology, medicine, politics and popular culture; historical and cultural processes creating modern concerns about sex and sexuality.
Prerequisite: Junior or senior classification.
Cross Listing: HIST 476/WGST 476.

WGST 477/HIST 477 Women and Gender in Modern European History
Credits 3. 3 Lecture Hours.
Women in Europe from the 18th century to the present: women's contributions to their societies; realities of their daily lives and their responses; perceptions of women; role of institutions in defining women's roles; significance for women of industrialization, revolution, warfare, scientific discoveries; interaction of class, race and gender.
Cross Listing: HIST 477/WGST 477.

WGST 481 Senior Seminar
Credits 3. 3 Lecture Hours.
Inquiry-based investigation of an issue, problem, or question, using gender or feminism as the organizing principle for analysis; methods and materials of scholarship in the field; includes opportunities for student research.
Prerequisite: Senior classification or approval of instructor.

WGST 484 Internship in Women’s and Gender Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed internship in a public or private organization to provide students with on-the-job training and applied research experience; opportunity to observe first hand issues and problems covered in women's and gender studies courses; designed to enhance and clarify the student's career objectives.
Prerequisites: 6 hours in women's and gender studies, junior or senior classification and approval of women's and gender studies director and internship coordinator.

WGST 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Readings and/or research for specific needs of students majoring or minoring in women’s and gender studies.
Prerequisites: Approval of women’s and gender studies director and faculty supervisor.

WGST 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in an identified area of women’s and gender studies. May be repeated for credit.

WGST 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in women’s and gender studies. May be taken four times for credit.
Prerequisites: 12 credits in WGST including 6 at 300-level; junior or senior classification and approval of instructor.

ZOOL 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Active research of basic nature under the supervision of a Department of Biology faculty member.
Prerequisites: Freshman or sophomore classification and approval of instructor.

ZOOL 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of zoology. May be repeated once for credit.

ZOOL 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Active research of basic nature under the supervision of a Department of Biology faculty member.
Prerequisites: Junior or senior classification and approval of instructor.
FACULTY

Faculty

Abanov, Artem G, Associate Professor
Physics And Astronomy
PHD, Texas A&M University, 1998

Abbey, James D, Assistant Professor
Information & Operations Mgmt
PHD, The Pennsylvania State University, 2013

Abbott, Elton D, Associate Professor of the Practice
Architecture
PHD, Texas A&M University, 1983

Abbott, Louise C, Professor
Vet Integrative Biosciences
DVM, Washington State University, 1988
PHD, University of Washington, 1982

Abdel Salam, Noha M, Clinical Assistant Professor
Public Health Sciences
MS, Loma Linda University, 2011
DDS, Loma Linda University, 2008

Abdel-Wahab, Ahmed I, Professor
Chemical Engineering Program
PHD, Texas A&M University, 2003

Abdi Mashhadimighani, Sara, Assistant Professor
Petroleum Engineering
PHD, University of Southern California, 2012

Abraham, Celeste M, Clinical Associate Professor
Periodontics
MS, University of Michigan, 1991
DDS, Howard University, 1988

Abu-Rub, Haithem A, Professor
Electrical and Computer Engineering Program
PHD, Gdansk University of Technology, Poland, 1995

Acero-Schertzer, Carmen E, Lecturer
Liberal Studies
PHD, University of Miami, 1996

Acosta, Sandra T, Assistant Professor
Educational Psychology
PHD, Texas A&M University, 2010

Acuff, Gary R, Professor
Nutrition & Food Science
PHD, Texas A&M University, 1985

Adair, Thomas W, Professor
Physics And Astronomy
PHD, Texas A&M University, 1965

Adams, George C, Senior Lecturer
International Studies Department
MA, Temple University, 1995

Adams, Leslie G, Senior Professor
Veterinary Pathobiology
PHD, Texas A&M University, 1968
DVM, Texas A&M University, 1964

Adams, Marvin L, Professor
Nuclear Engineering
PHD, University of Michigan, 1986

Adams, Rae A, Clinical Assistant Professor
Clinical Translational Medicine
BS, Texas A&M University, 2003

Adams, Terry B, Adjunct Assistant Professor
Orthodontics
MS, Baylor College of Dentistry, 1978
DDS, University of Missouri, 1973

Adelman, Zachary N, Associate Professor
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Altani, Koichiro, Associate Professor
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Petroleum Engineering  
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Visualization  
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Chemistry, Science Program  
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Restorative Sciences  
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DDS, Jordan University of Science and Technology, 1998

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Microbial Pathogenesis & Immuno  
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Alexander, Joyce M, Professor  
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Alexander, Lisa T, Professor  
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Alexander, Michael B, Lab Instructor  
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Alexander, Steve K, Lecturer  
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Alexander-Packard, Gerianne, Professor  
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Neuroscience & Experimental Therapeutics  
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Engineering Technology & Industrial Dist  
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Anderson, Terry H, Professor  
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PHD, Iowa State University, 1968
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Baker, Robert K, Lecturer
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Barge, James K, Professor
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CERT, Baylor College of Dentistry, 1972
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Barondeau, David P, Associate Professor
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Batista, Paul J, Associate Professor
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Batteas, James D, Professor
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PHD, University of California, Berkeley, 1995

Battle, Guy A, Professor
Mathematics
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Baudier, Florent P, Visiting Assistant Professor
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Baumann, Todd M, Adjunct Assistant Professor
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Bayless, Kayla J, Associate Professor
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Bazer, Fuller W, Distinguished Professor
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Bazzi, Hassan S, Professor
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Bearfield, Domonic A, Associate Professor
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Becker, Katrin, Professor
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Blackwell, James A, Lecturer
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PHD, Tufts University, 1984

Blake, Jamilia J, Associate Professor
Educational Psychology
PHD, University of Georgia, 2007

Blalock, Katherine E, Clinical Assistant Professor
Clinical Translational Medicine
MD, Texas A&M Health Science Center, 2011

Blason, Archie L, Adjunct Assistant Professor
Educ Admin & Human Resource Dev
PHD, Texas A&M University, 2005

Blanton, Carlos K, Professor
History
PHD, Rice University, 1999

Blanton, Hart, Professor
Communication
PHD, Princeton University, 1994

Blasingame, Thomas A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1989

Blasor, Tara N, Lecturer
Accounting
MS, Texas A&M University, 2007

Blomstedt, Larry W, Lecturer
Liberal Studies
PHD, Texas A&M University, 2008

Bloomfield, Susan A, Professor
Health & Kinesiology
PHD, The Ohio State University, 1992

Blue-McLendon, Alice, Clinical Associate Professor
Vet Physiology & Pharmacology
DVM, Texas A&M University, 1989

Bluemel, Janet F, Professor
Chemistry
PHD, Technical University of Munich, Germany, 1989

Boadu, Frederick O, Professor
Agricultural Economics
PHD, University of Kentucky, 1981

Boas, Harold P, Professor
Mathematics
PHD, Massachusetts Institute of Technology, 1980

Bodden, Jack L, Lecturer
Psychology
PHD, The Ohio State University, 1969

Bodson, Bruce R, Lecturer
Marine Sciences
JD, South Texas College of Law, 1993

Boehm, Rodney J, Associate Professor of the Practice
Engineering Student Serv & Academic Prog
MS, Texas A&M University, 1979

Boenig, Robert E, Professor
English
PHD, Rutgers, The State University of New Jersey, 1978

Bogomolnaya, Lydia M, Research Assistant Professor
Microbial Pathogenesis & Immunity
PHD, Kazan State University, 2001

Boivie, Steven R, Associate Professor
Management
PHD, The University of Texas at Austin, 2006

Bokelmann, Annamarie D, Instructional Assistant Professor
Environmental And Occupational Health
MS, Texas A&M University, 1999

Bolanos, Carlos A, Associate Professor
Psychology
PHD, Northeastern University, 1980

Boldt, Gary L, Senior Lecturer
Construction Science
BS, Texas A&M University, 1983

Bolger, Patrick A, Instructional Assistant Professor
Psychology
PHD, University of Arizona, 2016

Bolin, Jane L, Professor
Health Policy & Management
PHD, The Pennsylvania State University, 2002

Bolling, Melanie E, Lecturer
Vet Small Animal Clinical Sc
DVM, Texas A&M University, 2005

Bollinger, Kathryn L, Instructional Assistant Professor
Mathematics
MS, Texas A&M University, 1998
Bologan, Anatol, Lecturer
Visualization
MA, Goldsmiths University of London, 2014

Bolouri, Ali, Professor
Restorative Sciences
DDS, University of Tennessee Medical Units, 1976

Bond, Jon R, Professor
Political Science
PHD, University of Illinois at Urbana-Champaign, 1978

Bondos, Sarah E, Associate Professor
Molecular & Cellular Medicine
PHD, University of Illinois at Urbana-Champaign, 1998

Bondurant, John H, Clinical Assistant Professor
Tamu Libraries
MLS, University of Kentucky, 2005
MLS, University of Kentucky, 2005

Bonito, Andrea, Professor
Mathematics
PHD, Ecole Polytechnique Federale de Lausanne, France, 2006

Bonkale, Willy L, Clinical Assistant Professor
Psychiatry
PHD, Karolinska Institute, 1999

Bonner, Rickie, Clinical Assistant Professor
College Of Nursing
DNP, Regis University, 2012

Bookatz, Barnett N, Adjunct Associate Professor
Periodontics
MS, Baylor College of Dentistry, 1976
DDS, Baylor College of Dentistry, 1974

Boone, Edward F, Lecturer
Information & Operations Mgmt
MS, The Pennsylvania State University, 2000
MBA, University of Delaware, 1994

Booth, Geoffrey J, Associate Professor
Landscape Architecture & Urban Planning
MA, University of Queensland, 1987

Borchardt, Craig W, Instructional Assistant Professor
Humanities In Medicine
PHD, Texas A&M University, 1996

Borda, Elizabeth, Lecturer
Marine Biology
PHD, City University of New York, 2007

Borges Gonzalez, Alejandro, Associate Professor of the Practice
Architecture
MARC, Cornell University, 1994

Borhani Haghighi, Ali reza, Lecturer
Architecture
MARC, Virginia Polytechnic Institute and State University, 2012

Borosh, Itshak, Senior Professor
Mathematics
PHD, Weizmann Institute of Science, 1966

Borovoy Hofman, Nilly, Adjunct Assistant Professor
Pediatric Dentistry
MS, Universidad Tecnologica de Mexico, 2009
DDS, Universidad Tecnologica de Mexico, 2006

Borsh, Robert M, Associate Professor of the Practice
Engineering Technology & Industrial Dist
MID, Texas A&M University, 2003

Bosenbark, Margaret J, Clinical Assistant Professor
College Of Nursing
MNU, Texas A&M University, 2016

Bosquez, Janet M, Instructional Assistant Professor
Health & Kinesiology
MS, Texas A&M University, 1986

Bosquez, Joseph J, Visiting Lecturer
Liberal Studies
BS, Texas A&M University, 2011
CERT, National Association of Underwater Instructors, 2011

Bosshard, John C, Lecturer
Engineering Technology & Industrial Dist
PHD, Texas A&M University, 2012

Boswell, Wendy R, Professor
Management
PHD, Cornell University, 2000

Botezatu, Ioana Andreea, Assistant Professor & Extension Specialist
Horticultural Sciences
PHD, Brock University, 2013

Boucher, Anthony M, Clinical Associate Professor
Health & Kinesiology
PHD, Texas Woman's University, 2008

Boudreau, Christen E, Clinical Assistant Professor
Vet Small Animal Clinical Sc
DVM, Texas A&M University, 2010
PHD, Baylor College of Medicine, 2001

Boudreaux, Lowell A, Instructional Assistant Professor
Maritime Administration
MBA, Lamar University, 1996

Bouhali, Othmane, Research Professor
Physics, Science Program
PHD, Universite Libre de Bruxelles, Faculte des Sciences, 1999

Boulahouache, Chaouki, Instructional Assistant Professor
Marine Sciences
PHD, Syracuse University, 2002

Bourgeois, Peter J, Assistant Professor of the Practice
Marine Transportation
BS, U.S. Merchant Marine Academy, 1956
CERT, United States Coast Guard, 1956
Bouton, Cynthia A, Professor
History
PHD, State University of New York at Binghamton, 1985

Boutros, Joseph J, Professor
Electrical and Computer Engineering Program
PHD, Telecom Paris Tech (ENST), 1996

Bouton, Thomas W, Professor
Ecosystem Science & Mgmt
PHD, Brigham Young University, 1979

Bouwman, Christa, Associate Professor
Finance
PHD, University of Michigan, 2005

Bouwman, Hilary J, Lecturer
International Studies Department
PHD, University of Virginia, 2016

Bowen, Daniel H, Assistant Professor
Educ Admn & Human Resource Dev
PHD, University of Arkansas, 2013

Bowersox, Rodney D, Professor
Aerospace Engineering
PHD, Virginia Polytechnic Institute and State University, 1992

Bowling, Robert, Assistant Professor & Extension Specialist
Entomology
PHD, Kansas State University, 2003

Bowman, Ann O, Professor
Public Service & Administration
PHD, University of Florida, 1979

Bowman, John D, Instructional Associate Professor
Pharmacy Practice
MHA, Auburn University, 1976

Bowman, Kenneth P, Professor
Atmospheric Sciences
PHD, Princeton University, 1984

Bowman, Michael B, Professor
Petroleum Engineering Program
PHD, University of Sheffield, 1981

Boyd, Barry L, Associate Professor
Ag Leadership, Educ & Comm
PHD, Texas A&M University, 1991

Boyd, James G, Associate Professor
Aerospace Engineering
PHD, Texas A&M University, 1994

Bracci, Joseph M, Professor
Civil Engineering
PHD, State University of New York at Buffalo, 1992

Bracher, Nathan J, Professor
International Studies Department
PHD, The University of Texas at Austin, 1984

Brackin, Michael S, Assistant Lecturer
Civil Engineering
MS, Texas A&M University, 2010

Braga Neto, Ulisses, Associate Professor
Electrical & Computer Eng
PHD, Johns Hopkins University, 2002

Bragg, Belinda L, Lecturer
Political Science
PHD, Texas A&M University, 2006

Braman, Gavin S, Lecturer
Visualization
BED, Texas A&M University, 2009

Braman, Sandra, Professor
Communication
PHD, University of Minnesota, Twin Cities, 1988

Brandt, Paul C, Associate Professor
Neuroscience & Experimental Therapeutics
PHD, University of Kentucky, 1990

Brannan, Michael P, Assistant Professor
Mathematics
PHD, Queen's University, Canada, 2012

Brannstrom, Christian, Professor
Geography
PHD, University of Wisconsin - Madison, 1998

Bray, Amanda E, Clinical Assistant Professor
Clinical Translational Medicine
MD, Louisiana State University, 2012

Breaux, Wade J, Instructional Assistant Professor
Health & Kinesiology
MS, Texas A&M University, 2002

Brekken, Kirstin L, Instructional Professor
Health & Kinesiology
MS, Texas A&M University, 1982

Bremick, Mark A, Senior Lecturer
Pharmacy Practice
BS, The Ohio State University, 1994

Brenner, David A, Lecturer
International Studies Department
PHD, The University of Texas at Austin, 1993

Brett, Jeremy W, Assistant Professor
Tamu Libraries
MA, University of Maryland, 1999
MLS, University of Maryland, 1999

Brewer, Maurice A, Professor of the Practice
Biomedical Engineering
MBA, Harvard Graduate School of Business Administration, 1984

Brewer, Michael, Associate Professor
Entomology
PHD, University of California, Riverside, 1990
Briaud, Jean-Louis, Professor
Civil Engineering
PHD, University of Ottawa, Canada, 1979

Bridges, Cheryl H, Adjunct Professor
Marketing
BS, Texas Woman's University, 1968

Bridy, Andrew D, Instructional Associate Professor
Mathematics
PHD, University of Wisconsin - Madison, 2014

Briers, Gary E, Professor
Ag Leadership, Educ & Comm
PHD, Iowa State University, 1978

Bright, Leonard A, Associate Professor
Public Service & Administration
PHD, Portland State University, 2003

Brightsmith, Donald J, Associate Professor
Veterinary Pathobiology
PHD, Duke University, 1999

Brinsko, Steven P, Professor
Vet Large Animal Clinical Sc
PHD, Cornell University, 1995

Briske, David D, Professor
Ecosystem Science & Mgmt
PHD, Colorado State University, 1978

Brison, Natasha T, Assistant Professor
Health & Kinesiology
PHD, University of Georgia, 2015
JD, University of Georgia School of Law, 1998

Brock, Ralph A, Adjunct Assistant Professor
Orthodontics
MS, Texas A&M University, 2002
DDS, Meharry Medical College, 2000

Brody, Samuel, Professor
Landscape Architecture & Urban Planning
PHD, University of North Carolina at Chapel Hill, 2002

Brody, Samuel D, Professor
Marine Sciences
PHD, University of North Carolina at Chapel Hill, 2002

Brooker, Rebecca, Assistant Professor
Psychology
PHD, The Pennsylvania State University, 2011

Brooks, Charles E, Associate Professor
History
PHD, University of Buffalo, 1988

Brooks, David A, Professor
Oceanography
PHD, University of Miami, 1975

Brooks, Sarah D, Professor
Atmospheric Sciences
PHD, University of Colorado, 2002

Brooks, Stuart R, Lecturer
Liberal Studies
MA, University of Houston Clear Lake, 2009

Brossart, Dan F, Associate Professor
Educational Psychology
PHD, University of Missouri - Columbia, 1996

Brothers, Edward N, Professor
Chemistry, Science Program
PHD, The Pennsylvania State University, 1997

Brothers, Nicole M, Professor
Library
MLS, University of Pittsburgh, 2011

Broussard, Albert S, Professor
History
PHD, Duke University, 1977

Brown, Adam T, Clinical Assistant Professor
Pharmacy Practice
PHD, Texas A&M University, 2013

Brown, Alexander L, Associate Professor
Economics
PHD, California Institute of Technology, 2008

Brown, Lawrence S, Instructional Associate Professor
Chemistry
PHD, Princeton University, 1983

Brown, Lemar M, Executive Professor
Executive MBA Office
MBA, University of Pennsylvania (The Wharton School), 2000

Brown, Maureen D, Adjunct Assistant Professor
Dental Hygiene
BS, Baylor College of Dentistry, 2003

Brown, Philip R, Associate Professor
Liberal Studies
PHD, Texas A&M University, 2000

Brown, Robert D, Professor
Landscape Architecture & Urban Planning
PHD, University of Guelph, 1985
MLA, University of Guelph, 1982

Brown, William A, Professor
Public Service & Administration
PHD, Claremont Graduate University, 2000

Bruce, Richard C, Clinical Assistant Professor
College Of Nursing
MS, University of Phoenix, 2012

Brumbelow, James K, Associate Professor
Civil Engineering
PHD, Georgia Institute of Technology, 2001

Brundage, Adrienne L, Assistant Lecturer
Entomology
PHD, Texas A&M University, 2012
Bryan, Burt C, Clinical Assistant Professor
Restorative Sciences
DDS, Baylor College of Dentistry, 1979

Bryant, John A, Associate Professor
Construction Science
PHD, Texas A&M University, 1995

Bryant, Vaughn M, Professor
Anthropology
PHD, The University of Texas at Austin, 1969

Bryk, Mary E, Associate Professor
Biochemistry & Biophysics
PHD, Albany Medical College, 1994

Buchanan, John J, Professor
Health & Kinesiology
PHD, Florida Atlantic University, 1996

Buchanan, Walter W, Professor
Engineering Technology & Industrial Dist
PHD, Indiana University, 1993

Buckley, John J, Professor of the Practice
Health Policy & Management
MBA, The George Washington University, 1969

Buckner, Sean M, Clinical Assistant Professor
Tamu Libraries
MS, University of Michigan, 2012
MA, University of Utah, 2010

Budinskaya, Oksana V, Clinical Associate Professor
Diagnostic Sciences
DDS, Omsk State Medical Institute Russia, 1990

Budke, Christine M, Associate Professor
Vet Integrative Biosciences
PHD, Philosophisch-Naturwissenschaftliche Fakultat der Universitat Basel, 2004
DVM, Purdue University, 2001

Budzise-Weaver, Tina M, Assistant Professor
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MLS, University of North Texas, 2012

Buenger, Sarah D, Lecturer
Agricultural Economics
MS, College for Financial Planning, 2015

Buenger, Victoria L, Clinical Professor
Management
PHD, Texas A&M University, 1990

Bukkapatnam, Satish T, Professor
Industrial & Systems Eng
PHD, The Pennsylvania State University, 1997

Bullock, Justin B, Assistant Professor
Public Service & Administration
PHD, The University of Georgia, 2014

Burch, Dan, Clinical Assistant Professor
Pediatric Dentistry
CERT, Howard University, 2015
DDS, University of Tennessee Health Science Center Memphis, 2013

Burch, Robert W, Professor
Philosophy & Humanities
PHD, Rice University, 1969

Burdine, James N, Professor
Hlth Promotion & Comm Hlth Sci
PHD, The University of North Carolina at Chapel Hill, 1979

Burford, Nancy G, Associate Professor
Tamu Libraries
MLS, University of North Texas, 1999

Burge, Mark E, Professor
School Of Law
JD, The University of Texas School of Law, 1997

Burgess, Kevin, Professor
Chemistry
PHD, The University of Cambridge, 1983

Burghardt, Beatrix, Visiting Assistant Professor
Teaching, Learning And Culture
PHD, Indiana University, 2015

Burghardt, Robert C, Professor
Vet Integrative Biosciences
PHD, Wayne State University, 1976

Burk, James S, Professor Emeritus
Sociology
PHD, University of Chicago, 1982

Burkart, Patrick C, Professor
Communication
PHD, The University of Texas at Austin, 2000

Burke, Adam J, Lecturer
Engineering Technology & Industrial Dist
MEN, Texas A&M University, 2015

Burke, Mack D, Associate Professor
Educational Psychology
PHD, University of Oregon, 2001

Burke, Shanna H, Professor
Educational Psychology
PHD, University of Oregon, 1998

Burlbaw, Lynn M, Professor
Teaching, Learning And Culture
PHD, The University of Texas at Austin, 1989

Burnett, Janna E, Clinical Assistant Professor
Restorative Sciences
DDS, Baylor College of Dentistry, 2009

Burns, Rebecca J, Clinical Assistant Professor
College Of Nursing
DNP, Loyola University New Orleans, 2015
Burress, Cynthia B, Instructional Assistant Professor
School Of Law
JD, Seattle University School of Law, 2003

Burris, Mark W, Professor
Civil Engineering
PHD, University of South Florida, 2001

Burt, John Z, Adjunct Professor
School Of Law
JD, Texas Wesleyan University School of Law, 2009

Busch, Paul S, Professor
Marketing
PHD, The Pennsylvania State University, 1974

Buschang, Peter H, Professor
Orthodontics
PHD, The University of Texas at Austin, 1980

Bustamante, Juan J, Instructional Assistant Professor
Pharmaceutical Sciences
PHD, The University of Texas at San Antonio, 2003

Bustos, Isaac D, Instructional Assistant Professor
Performance Studies
PHD, The University of Texas at Austin, 2010

Butenko, Sergiy I, Professor
Industrial & Systems Eng
PHD, University of Florida, 2003

Butler, Scott N, Lecturer
Engineering Technology & Industrial Dist
MS, Sam Houston State University, 1986

Butler-Purry, Karen L, Professor
Electrical & Computer Eng
PHD, Howard University, 1994

Byington, Carrie L, Professor
Clinical Translational Medicine
MD, Baylor College of Medicine, 1989

Bynum, Edsel, Associate Professor & Extension Specialist
Entomology
PHD, Texas Tech University, 2003

Byrne, David H, Professor
Horticultural Sciences
PHD, Cornell University, 1980

Byrnes, William H, Executive Professor
School Of Law
LLM, Universiteit van Amsterdam, 1995
JD, Loyola University School of Law, 1992

Byrns, Glenda E, Clinical Associate Professor
Educational Psychology
PHD, Texas A&M University, 2007

Cabrera, Joshua V, Clinical Assistant Professor
Clinical Translational Medicine
MD, Oregon Health Sciences University, 1998

Caffey, Stephen M, Instructional Assistant Professor
Architecture
PHD, The University of Texas at Austin, 2008

Cagin, Gul, Lecturer
Visualization
MFA, Claremont Graduate University, 2001

Cagin, Tahir, Professor
Materials Science And Engineering
PHD, Clemson University, 1998

Cahill, Anthony T, Associate Professor
Civil Engineering
PHD, Johns Hopkins University, 1998

Cai, Cexun, Assistant Professor
Marketing
PHD, University of Pennsylvania (The Wharton School), 2015

Cai, Jing, Associate Professor
Vet Integrative Biosciences
PHD, University of Hong Kong, 2006

Cai, Yue, Visiting Assistant Professor
Mathematics
PHD, University of Kentucky, 2016

Cai, Zhuo, Adjunct Assistant Professor
Orthodontics
PHD, The Ohio State University, 1996
DDS, Beijing Medical University, 1987

Cairns, David M, Professor
Geography
PHD, University of Iowa, 1995

Calboli, Irene, Professor
School Of Law
LLM, London School of Economics and Political Science, 1999

Caldwell, David J, Professor
Poultry Science
PHD, Texas A&M University, 1997

Caldwell, Heather L, Instructional Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2009

Call, Matthew L, Assistant Professor
Management
PHD, University of South Carolina, 2016

Callaghan, Timothy H, Assistant Professor
Health Policy & Management
PHD, University of Minnesota, Twin Cities, 2016

Camacho, Antolino C, Clinical Assistant Professor
Restorative Sciences
CERT, Brooke Army Medical Center, 1980
DMD, University of Puerto Rico Medical Sciences School of Dentistry, 1975
Campagnol Abuabara, Gabriela, Lecturer
Architecture
PHD, University of Sao Paulo - USP, 2008

Campana, Lilia, Instructional Assistant Professor
Visualization
PHD, Texas A&M University, 2014

Campbell, August J, Instructional Assistant Professor
Health & Kinesiology
PHD, Texas State University, 2005

Campbell, Heidi A, Associate Professor
Communication
PHD, The University of Edinburgh, 2002

Campbell, Kelli R, Instructional Assistant Professor
Health & Kinesiology
MS, Texas A&M University, 2000

Campbell, Lisa, Professor
Oceanography
PHD, State University of New York at Stony Brook, 1985

Campbell, Mary E, Associate Professor
Sociology
PHD, University of Wisconsin - Madison, 2004

Campbell, Patricia A, Professor
Dental Hygiene
MS, Old Dominion University, 1989

Campbell, Phillip M, Clinical Associate Professor
Orthodontics
MS, Baylor University College of Dentistry, 1973
DDS, Baylor University College of Dentistry, 1971

Campos-Bowers, Monica H, Instructional Assistant Professor
Public Health Studies
DrPH, University Of North Texas Health Science Center, 2008

Cannaday, Rania A, Clinical Assistant Professor
Clinical Translational Medicine
MD, The University of Texas Health Science Center at Houston, 2014

Cannella, Albert A, Professor
Management
PHD, Columbia University, 1991

Cannon, Carolyn L, Associate Professor
Microbial Pathogenesis & Immu
PHD, The University of Texas Health Science Center at Houston, 1993

Cannon, Marvin S, Visiting Professor
Vet Integrative Biosciences
PHD, The Ohio State University, 1969

Cantey, Samuel B, Adjunct Professor
School Of Law
LLM, Georgetown University Law Center, 2003
JD, University of Tulsa College of Law, 2002

Cantrell, Emily S, Clinical Assistant Professor
Teaching, Learning And Culture
PHD, Texas A&M University, 2008

Cantrell, Pierce E, Senior Associate Professor
Electrical & Computer Eng
PHD, Georgia Institute of Technology, 1981

Capar, Ismail, Associate Professor
Engineering Technology & Industrial Dist
PHD, Mississippi State University, 2007

Capareda, Sergio C, Professor
Biological and Agricultural Eng
PHD, Texas A&M University, 1990

Capper, David W, Instructional Assistant Professor
Liberal Studies
PHD, Baylor University, 2013

Capra, Mary M, Professor
Teaching, Learning And Culture
PHD, University of Southern Mississippi, 2000

Capra, Robert M, Professor
Teaching, Learning And Culture
PHD, University of Southern Mississippi, 2000

Cardoso De Cardoso, Leonardo, Assistant Professor
Performance Studies
PHD, The University of Texas at Austin, 2013

Carey, John B, Professor
Poultry Science
PHD, Kansas State University, 1982

Carley, Robert F, Assistant Professor
International Studies Department
PHD, Texas A&M University, 2012

Carlson, David L, Professor
Anthropology
PHD, Northwestern University, 1979

Carlson, David S, Adjunct Professor
Biomedical Sciences
PHD, University of Massachusetts Amherst, 1974

Carlson, Deborah N, Associate Professor
Anthropology
PHD, The University of Texas at Austin, 2004

Carlson, Kimberly A, Senior Lecturer
Construction Science
MARc, Texas A&M University, 2002

Carly-Miles, Claire I, Lecturer
English
PHD, Texas A&M University, 2008

Carney, Ginger E, Professor
Biology
PHD, University of Georgia, 1998

Carney, Sara E, Assistant Lecturer
Ocean Engineering
MS, Texas A&M University, 2016
Carpenter, Megan M, Professor
School Of Law
LLM, National University of Ireland, 2003
JD, West Virginia University, 1999

Carrigan, Esther E, Professor
Tamu Libraries
MLS, State University of New York, 1975

Carrillo, Genny, Associate Professor
Environmental And Occupational Health
PHD, Tulane University School of Public Health, 1993

Carrillo, Roberto, Adjunct Assistant Professor
Orthodontics
MS, Texas A&M Baylor College of Dentistry, 2005
DDS, Universidad Autonoma de Nuevo Leon, 2002

Carrino, Gerard E, Instructional Professor
Public Health Studies
PHD, Columbia University Mailman School of Public Health, 2005

Carroll, Julie H, Senior Lecturer
Statistics
MS, Texas A&M University, 1990
MS, Texas A&M University, 1985

Carroll, Matthew C, Instructional Assistant Professor
Marine Engineering
PHD, University of Illinois at Urbana-Champaign, 1986

Carroll, Raymond J, Distinguished Professor
Statistics
PHD, Purdue University, 1974

Carstens, Gordon E, Professor
Animal Science
PHD, Colorado State University, 1998

Carter Sowell, Adrienne R, Associate Professor
Psychology
PHD, Purdue University, 2010

Carter, Jeanne M, Assistant Lecturer
Teaching, Learning And Culture
MS, University of North Texas, 2011
MED, Sam Houston State University, 1997

Carter, Misti H, Clinical Assistant Professor
Clinical Translational Medicine
PHD, The University of Texas at Austin, 2003

Carter, Norvella P, Professor Emeritus
Teaching, Learning And Culture
PHD, Loyola University Chicago, 1990

Carter, Tamara A, Instructional Assistant Professor
Mathematics
PHD, Texas A&M University, 2005

Cartwright, Chris S, Clinical Assistant Professor
Restorative Sciences
MHA, Texas Woman's University, 1999
DDS, Baylor College of Dentistry, 1978

Casado Perez, Vanessa, Associate Professor
School Of Law
DJS, New York University, 2014

Case, Raymundo P, Professor of the Practice
Materials Science And Engineering
PHD, University of Manchester Institute of Science and Technology, 2002

Casola, Claudio, Assistant Professor
Ecosystem Science & Mgmt
PHD, University of Pisa, Italy, 2006

Cassell, Edith C, Clinical Associate Professor
Teaching, Learning And Culture
PHD, Purdue University, 2007

Castaneda-Lopez, Homero, Associate Professor
Materials Science And Engineering
PHD, The Pennsylvania State University, 2001

Castell-Perez, M Elena, Professor
Biological and Agricultural Eng
PHD, Michigan State University, 1990

Castier, Marcelo, Professor
Chemical Engineering Program
PHD, The Technical University of Denmark, 1988

Castillo, Alejandro, Associate Professor
Animal Science
PHD, Texas A&M University, 1998

Castillo, Jasen J, Associate Professor
International Affairs
PHD, University of Chicago, 2003

Castillo, Linda G, Associate Professor
Educational Psychology
PHD, University of Utah, 1999

Castillo, Marco, Associate Professor
Economics
PHD, University of Wisconsin - Madison, 2001

Castor, Nicole M, Assistant Professor
Anthropology
PHD, University of Chicago, 2009

Castro Olivo, Sara M, Associate Professor
Educational Psychology
PHD, University of Oregon, 2007

Castro, Juan F, Clinical Assistant Professor
Pharmacy Practice
MBA, University of Houston at Clear Lake, 2000
MD, Texas A&M University, 1988

Cath, Adam E, Professor
Library
MLS, Victoria University of Wellington, 1997

Caton, Amy J, Instructional Assistant Professor
Library
MLS, University of North Texas, 2012
Caton, Jerald A, Professor
Mechanical Engineering
PHD, Massachusetts Institute of Technology, 1980

Caverlee, James B, Associate Professor
Computer Science & Engineering
PHD, Georgia Institute of Technology, 2007

Cecchini, Fabiana, Instructional Assistant Professor
International Studies Department
PHD, University of Pennsylvania, 2007

Ceen, Richard F, Adjunct Professor
Orthodontics
CERT, Columbia University, 1972
DDS, University of Tennessee Health Science Center, 1966

Cerrato, Maddalena A, Lecturer
International Studies Department
PHD, Italian Institute for Human Sciences, 2013

Cervantes, Marcella D, Instructor
Molecular & Cellular Medicine
PHD, University of Washington, 2006

Cha, Minsu, Assistant Professor
Civil Engineering
PHD, Georgia Institute of Technology, 2012

Chaffin, Morgan K, Professor
Vet Large Animal Clinical Sc
MS, Texas A&M University, 1990
DVM, North Carolina State University, 1985

Chai, Jinxiang, Associate Professor
Computer Science & Engineering
PHD, Carnegie Mellon University, 2006

Chakravorty, Suman, Associate Professor
Aerospace Engineering
PHD, University of Michigan, 2004

Chamitoff, Gregory E, Professor of the Practice
Aerospace Engineering
PHD, Massachusetts Institute of Technology, 1992

Champion, Katherine A, Instructional Assistant Professor
Neuroscience & Experimental Therapeutics
PHD, University of California, Berkeley, 2012

Chandler, Jacob R, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
EDD, Sam Houston State University, 2013
MS, Sam Houston State University, 2004

Chandler, Ronald S, Executive Professor
Management
MS, Texas A&M University, 2001

Chang, Jiang, Associate Professor
Institute Of Biosciences & Tech
PHD, Texas A&M University, 1999

Chang, Kuang-An, Professor
Civil Engineering
PHD, Cornell University, 1999

Chang, Ping, Professor
Oceanography
PHD, Princeton University, 1988

Chang, Yanling, Assistant Professor
Engineering Technology & Industrial Dist
PHD, Georgia Institute of Technology, 2015

Chapin, Robert, Instructor
Naval Sciences
MSEng, Johns Hopkins University, 2015

Chapkin, Robert S, Professor
Nutrition & Food Science
PHD, University of California, Davis, 1986

Chapman, Denise D, Instructional Assistant Professor
Health & Kinesiology
MS, University of Central Missouri, 2000

Chapman, Piers, Professor
Oceanography
PHD, University of Wales, UK, 1983

Charles, Laurie A, Clinical Assistant Professor
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MS, Western Governor's University, 2015

Charlot, Jean-Baptiste, Lecturer
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MA, Texas A&M University, 2015

Charoenphol, Phapanin, Research Assistant Professor
Mechanical Engineering
DEN, University of Michigan, 2012

Chau, Van B, Clinical Assistant Professor
Restorative Sciences
DDS, Baylor College of Dentistry, 1993

Cheff, Stephen O, Clinical Assistant Professor
Endodontics
MS, The University of Texas Health Science Center at Houston, 1976
DDS, University of Michigan, 1972

Cheibub, Jose A, Professor
Political Science
PHD, University of Chicago, 1994

Chellam, Shankaraman, Professor
Civil Engineering
PHD, Rice University, 1995

Chen, Goong, Professor
Mathematics
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Geology & Geophysics
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Construction Science
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PHD, University of Illinois at Urbana-Champaign, 1994

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Environmental And Occupational Health
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Political Science
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Architecture
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Biology  
PHD, Oregon State University, 2005

Criscone, John C, Professor  
Biomedical Engineering  
PHD, Johns Hopkins University School of Medicine, 2005

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Animal Science
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Construction Science
JD, Wake Forest University School of Law, 2003

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International Affairs
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Damnjanovic, Ivan, Associate Professor
Civil Engineering
PHD, The University of Texas at Austin, 2006

Daniel, Stephen H, Professor
Philosophy & Humanities
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Pharmaceutical Sciences
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Danenbaum, Joseph H, Instructional Associate Professor
Health & Kinesiology
MA, Oklahoma State University, 2005

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PHD, University of California, Berkeley, 1994

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Visualization
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Dawson Mathur, Vani A, Assistant Professor
Psychology
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Vet Small Animal Clinical Sc
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Dawson, Joseph G, Professor
History
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PHD, Texas A&M University, 2014
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PHD, University of California, Riverside, 1996

De Ruiter, Darryl J, Professor
Anthropology
PHD, University of the Witwatersrand, South Africa, 2001
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PHD, Purdue University, 1987

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Biomedical Sciences  
PHD, University of Chicago, 1980

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Pediatric Dentistry  
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Delgado, Adolfo, Associate Professor  
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Marine Sciences  
PHD, The College of William & Mary, 1999

Demkowicz, Michal J, Associate Professor  
Materials Science And Engineering  
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Demlow, Alan R, Professor  
Mathematics  
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Demorrow, Sharon, Associate Professor  
Internal Medicine  
PHD, The University of Queensland, 1999

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JD, University of Oklahoma, 2004

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Physics And Astronomy  
PHD, University of Hawaii at Manoa, 1987

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Atmospheric Sciences  
PHD, Harvard University, 1994

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PHD, Michigan State University, 2003

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PHARMD, Texas Tech University, 2015

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Dixon, Marlene A, Professor  
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MA, Texas A&M University, 2003
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PHD, The Pennsylvania State University, 2017

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Edwards, John F, Professor
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Edwardson, Jeffrey C, Senior Lecturer
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Visualization  
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Elabd, Yossef A, Professor  
Chemical Engineering  
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Chemical Engineering Program  
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Ellis, Robert B, Instructional Assistant Professor  
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Finance  
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PHD, Maastricht University, Netherlands, 2009
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Erickson, James W, Associate Professor
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JD, Michigan State University, 2006

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Ficht, Allison R, Professor
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Filippi, Anthony M, Associate Professor
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Finkelstein, Alexander, Professor
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Flint, Gerald D, Clinical Professor
Management
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Microbial Pathogenesis & Imm
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Folden, Charles, Instructional Assistant Professor Emeritus
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Chemistry
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Foote, Lorien L, Professor
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Ford, John R, Associate Professor
Nuclear Engineering
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Forrest, David W, Professor
Animal Science
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Fortunato, David, Assistant Professor
Political Science
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Economics
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Internal Medicine
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Francis, James, Lecturer
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PHD, Middle Tennessee State University, 2010

Frank-Cannon, Tamy C, Clinical Assistant Professor
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Frauenfeld, Oliver W, Associate Professor
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Fredrickson, Henry W, Professor of the Practice
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Freed, Alan D, Professor
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PHD, University of Georgia, 2008

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Gabbai, Francois P, Professor
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Gaharwar, Akhilesh K, Assistant Professor
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PHD, University of Connecticut, 2006

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Garcia, Tanya P, Assistant Professor
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Health & Kinesiology
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Girimaji, Sharath, Professor
Aerospace Engineering
PhD, Cornell University, 1990

Girimaji, Sharath S, Professor
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Giusti, Cecilia H, Associate Professor
Landscape Architecture & Urban Planning
PhD, The University of Texas at Austin, 2001

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Chemistry
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Glaser, Shannon S, Associate Professor
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Glasner, Margaret E, Associate Professor
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Glass, Amy J, Associate Professor
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Glass, Kati P, Clinical Assistant Professor
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LLM, University of New Hampshire, 1998
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Glickman, Gerald N, Professor
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MS, Northwestern University Dental School, 1984
DDS, The Ohio State University, 1978
Glowacki, Kevin T, Associate Professor
Architecture
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Godwin, Allen D, Associate Professor of the Practice
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Goebel, Frank E, Professor
Anthropology
PHD, University of Alaska Fairbanks, 1993

Gohil, Vishal M, Assistant Professor
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Goidel, Robert K, Professor
Communication
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Gold Bouchot, Gerardo, Professor
Oceanography
PHD, CINVESTAV Merida, 1991

Goldberg, Daniel W, Assistant Professor
Geography
PHD, University of Southern California, 2010

Golding, Michael C, Associate Professor
Vet Physiology & Pharmacology
PHD, Texas A&M University, 2003

Goldman, Michael R, Adjunct Professor
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Goldsby, Dianne S, Clinical Professor
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PHD, University of New Orleans, 1994

Goldsmith, Patrick A, Associate Professor
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Golla, Michael R, Senior Lecturer
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Golsan, Ines D, Senior Lecturer
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Gomer, Richard H, Professor
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Gomes, Carmen L, Associate Professor
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Gomez, Daniel, Instructional Associate Professor
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Plant Pathology & Microbiology
PHD, University of Nebraska, 1978

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Diagnostic Sciences
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CERT, Texas A&M University, 2005
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Gooch, Bruce S, Associate Professor
Computer Science & Engineering
PHD, University of Utah, 2003

Goodey, Joanna R, Instructional Assistant Professor
Chemistry
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Goodson, Patricia, Professor
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Goodwin, Susan P, Associate Professor
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Gopalswamy, Swaminathan, Professor of the Practice
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Gorman, Dennis M, Professor
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Gottlieb, Jessica A, Assistant Professor
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Goulart, Ana E, Associate Professor
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Grasley, Zachary C, Professor
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PHD, University of California, Davis, 1976

Grossman, Ethan L, Professor  
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Grossman, Steven D, Associate Professor  
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Mechanical Engineering  
PHD, University of Minnesota, Twin Cities, 2001

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Biomedical Engineering  
PHD, University of South Carolina, 2004

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PHD, Georgia Institute of Technology, 2008

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Mechanical Engineering  
PHD, Tsinghua University, China, 2015

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PHD, Universite De Provence, 1982

Guermont, Jean-Luc, Professor  
Mathematics  
PHD, Sorbonne Universites, 1995

Guidry, Jeffrey J, Associate Professor  
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Guillen, George J, Lecturer  
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Guinn, James R, Instructional Assistant Professor  
Health & Kinesiology  
MA, Abilene Christian University, 2012

Guiseppi Elie, Anthony, Professor  
Biomedical Engineering  
PHD, Massachusetts Institute of Technology, 1983

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Medical Physiology  
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Gunasekaran, Senthilmu, Lecturer  
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DEN, Texas A&M University, 2014

Guneralp, Burak, Research Assistant Professor  
Geography  
PHD, University of Illinois at Urbana-Champaign, 2006

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MS, Texas A&M University, 2005

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Mechanical Engineering Program  
PHD, Tsinghua University, China, 1998

Guo, Shaodong, Associate Professor  
Nutrition & Food Science  
PHD, Peking University, China, 1995

Gupta, Sudhiranjan, Assistant Professor  
Medical Physiology  
PHD, Bose Institute, 1997

Gursky, Sharon, Professor  
Anthropology  
PHD, State University of New York at Stony Brook, 1997

Gustafson, Robert A, Associate Professor  
Mathematics  
PHD, Yale University, 1979

Gutierrez-Osuna, Ricardo, Professor  
Computer Science & Engineering  
PHD, North Carolina State University, 1998

Guyton, Sally C, Senior Lecturer  
Finance  
MBA, The University of Texas at Austin, 1982

Haberl, Jeff, Professor  
Architecture  
PHD, University of Colorado, 1986

Haefeli, Evan P, Associate Professor  
History  
PHD, Princeton University, 2000

Haglund, John S, Senior Lecturer  
Mechanical Engineering  
PHD, Texas A&M University, 2003

Hague, Steven S, Associate Professor  
Soil & Crop Sciences  
PHD, Texas A&M University, 2000

Hailey, Camille E, Senior Lecturer  
Management  
JD, South Texas College of Law, 1993

Hajimirza, Shima, Assistant Professor  
Mechanical Engineering  
PHD, Texas A&M University, 2013
Hala, David, Assistant Professor
Marine Biology
PHD, Brunel University, 2007

Haliburton, James T, Lecturer
Architecture
MARC, Texas A&M University, 2014

Hall, Charles R, Professor
Horticultural Sciences
PHD, Mississippi State University, 1988

Hall, Christopher, Lecturer
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MBA, Texas A&M University, 2003

Hall, Michael B, Professor
Chemistry
PHD, University of Wisconsin - Madison, 1971

Hall, Robert J, Associate Professor
Educational Psychology
PHD, University of California, Los Angeles, 1979

Hallermann, Detlef, Clinical Professor
Finance
PHD, Colorado School of Mines, 1999

Halling, Thomas D, Associate Professor
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Hamer, Gabriel L, Assistant Professor
Entomology
PHD, Michigan State University, 2008

Hamer, Sarah A, Associate Professor
Vet Integrative Biosciences
DVM, Michigan State University, 2011
PHD, Michigan State University, 2010

Hamie, Christine S, Lecturer
International Affairs
PHD, University of York, 2007

Hamilton, Daniel K, Professor
Architecture
MS, Pepperdine University, 2003

Hamilton, Donny L, Professor
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PHD, The University of Texas at Austin, 1975

Hamilton, Wayne T, Senior Lecturer
Ecosystem Science & Mgmt
MS, Sul Ross State University, 1976

Hammer, Janet E, Clinical Professor
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Hammes, Ursula, Visiting Professor
Geology & Geophysics
PHD, University of Colorado, Boulder, 1992

Hammond, Tracy A, Professor
Computer Science & Engineering
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Hamouda, Ayman K, Assistant Professor
Pharmaceutical Sciences
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Han, Arum, Professor
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Han, Daikwon, Associate Professor
Epidemiology & Biostatics
PHD, University of Buffalo, 2003

Han, Gang, Associate Professor
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PHD, The Ohio State University, 2016

Han, Guichun, Clinical Assistant Professor
Vet Physiology & Pharmacology
PHD, Dalian Medical University, China, 2002

Han, Je C, Distinguished Professor
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Hanagriff, Roger D, Instructional Associate Professor
Ag Leadership, Educ & Comm
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Hancock, Jay P, Assistant Lecturer
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MS, Texas A&M University, 1984

Hand, Michael R, Professor
Philosophy & Humanities
PHD, Florida State University, 1985

Haney, Adam D, Lecturer
Liberal Studies
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Haque, Mohammed E, Professor
Construction Science
PHD, New Jersey Institute of Technology, 1995
Hara, Kentaro, Assistant Professor
Aerospace Engineering
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Hardin, Paul E, Distinguished Professor
Biology
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Hardy, Joanne, Clinical Associate Professor
Vet Large Animal Clinical Sc
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DVM, University of Montreal, 1982

Hardy, John C, Distinguished Professor
Physics And Astronomy
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Maritime Administration
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Harlin, Julie F, Associate Professor
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Harlow, Mark L, Assistant Professor
Biology
PHD, Stanford University, 2001

Harmel, Robert, Professor
Political Science
PHD, Northwestern University, 1977

Harness, Nathaniel J, Instructional Associate Professor
Agricultural Economics
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Periodontics
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Mathematics
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Harris, James E, Professor of the Practice
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Harris, Joseph A, Adjunct Assistant Professor
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Harris, Joseph A, Associate Professor
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Statistics
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Hartberg, Yasha M, Lecturer
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Hartwig, Karl T, Professor
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Petroleum Engineering
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Hasan, M M Faruque, Assistant Professor
Chemical Engineering
PHD, National University of Singapore, 2010
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Hassan, Ibrahim, Professor
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Statistics
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DNP, Texas Tech University Health Science Center, 2010
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He, Ping, Professor
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He, Weiling, Associate Professor
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Heaps, Cristine L, Associate Professor
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PHD, University of Missouri - Columbia, 1999

Healey, Jennifer J, Associate Professor
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Heffer, Robert W, Clinical Professor
Psychology
PHD, Louisiana State University, 1988

Hegde, Rashmi, Adjunct Assistant Professor
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Heim, Gregory R, Associate Professor
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Hein, Travis W, Professor
Surgery
PHD, Texas A&M University, 1997

Heinz, Kevin M, Professor
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PHD, University of California, Riverside, 1989

Heird, James C, Executive Professor
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Henderson, Michelle, Lecturer
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Hernandez Magallanes, Irma Del Consue, Distinguished Professor
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Hester, Yvette C, Instructional Assistant Professor
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PHD, Texas A&M University, 1992
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Holder, Eugene P, Instructional Assistant Professor
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Holditch, Stephen A, Professor
Petroleum Engineering
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Holladay, Sherry J, Professor
Communication
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Holland, Brian, Assistant Professor
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MSN, Lubbock Christian University, 2008

Holland, Hubert B, Professor
School Of Law
LLM, Columbia University School of Law, 2003
JD, American University Washington College of Law, 1998

Hollenbach, Florian M, Assistant Professor
Political Science
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Holliday, Ray W, Assistant Professor of the Practice
Architecture
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Architecture
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Honeyman, Allen L, Associate Professor
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Hook, Axel M, Professor
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Anthropology
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Horbaczewski, Ian D, Associate Professor of the Practice
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Horlen, Joseph P, Associate Professor
Construction Science
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Horney, Jennifer A, Associate Professor
Epidemiology & Biostatics
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Horvillo, Juan J, Associate Professor
Ocean Engineering
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Horseman, Michael A, Clinical Associate Professor
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Hou, I-Hong, Assistant Professor
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Health & Kinesiology
MED, Texas A&M University, 2008

House, Donald, Lecturer
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House, Felice L, Assistant Professor
Visualization
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MS, Texas A&M University, 2006

Houston, Mark B, Professor
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Howard, Daniel L, Professor
Sociology
PHD, Vanderbilt University, 1992

Howard, Michael D, Assistant Professor
Management
PHD, University of Washington, 2012

Howard, Peter B, Professor
Mathematics
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Howe, Lisa M, Professor
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PHD, Texas A&M University, 1993
DVM, Texas A&M University, 1987

Howe, Roger, Professor
Teaching, Learning And Culture
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Howell, Jessica M, Associate Professor
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Hoyos, Sebastian, Associate Professor
Electrical & Computer Eng
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Hsieh, Sheng-Jen, Professor
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Hu, James C, Professor
Biochemistry & Biophysics
PHD, University of Wisconsin - Madison, 1987

Hu, Jiang, Professor
Electrical & Computer Eng
PHD, University of Minnesota, Twin Cities, 2001
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<th>Name</th>
<th>Title</th>
<th>Department/Program</th>
<th>Degree Institution</th>
<th>Year</th>
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<tr>
<td>Hu, Xia</td>
<td>Assistant Professor</td>
<td>Computer Science &amp; Engineering</td>
<td>PHD, Arizona State University, 2015</td>
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<td>Huang, Chang S</td>
<td>Associate Professor</td>
<td>Landscape Architecture &amp; Urban Planning</td>
<td>PHD, University of Pennsylvania, 1995</td>
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<td>Huang, Gang</td>
<td>Professor</td>
<td>Electrical and Computer Engineering Program</td>
<td>DSC, Washington University in St. Louis, 1980</td>
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<td>Huang, Gang M</td>
<td>Professor</td>
<td>Electrical &amp; Computer Eng</td>
<td>PHD, Washington University in St. Louis, 1980</td>
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<td>Huang, Jianhua</td>
<td>Professor</td>
<td>Statistics</td>
<td>PHD, University of California, Berkeley, 1997</td>
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<td>Huang, Reyko</td>
<td>Assistant Professor</td>
<td>International Affairs</td>
<td>PHD, Columbia University, 2012</td>
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<td>Assistant Professor</td>
<td>Computer Science &amp; Engineering</td>
<td>PHD, University of Utah, 2014</td>
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<td>Computer Science &amp; Engineering</td>
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<td>Lecturer</td>
<td>Biomedical Engineering</td>
<td>PHD, Massachusetts Institute of Technology, 2009</td>
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<td>Huang, Tingwen</td>
<td>Professor</td>
<td>Mathematics, Science Program</td>
<td>PHD, Texas A&amp;M University, 2002</td>
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<td>Huang, Yongheng</td>
<td>Associate Professor</td>
<td>Biological and Agricultural Eng</td>
<td>PHD, University of Nebraska - Lincoln, 2002</td>
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<td>Huang, Yun</td>
<td>Assistant Professor</td>
<td>Institute Of Biosciences &amp; Tech</td>
<td>PHD, Georgia State University, 2009</td>
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<td>Hubbard, David E</td>
<td>Associate Professor</td>
<td>Tamu Libraries</td>
<td>PHD, Northwest Missouri State University, 2012</td>
<td>2003</td>
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<td>Hubbard, John K</td>
<td>Instructional Associate Professor</td>
<td>Neuroscience &amp; Experimental Therapeutics</td>
<td>PHD, Texas A&amp;M University, 1996</td>
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<td>Huber, John C</td>
<td>Lecturer</td>
<td>Health Policy &amp; Management</td>
<td>PHD, The University of Texas Health Science Center, 2004</td>
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<td>Professor</td>
<td>History</td>
<td>PHD, Yale University, 2007</td>
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<td>History</td>
<td>PHD, Texas A&amp;M University, 1998</td>
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<td>Clinical Professor</td>
<td>Health &amp; Kinesiology</td>
<td>PHD, Texas A&amp;M University, 2007</td>
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<td>Professor</td>
<td>International Affairs</td>
<td>PHD, The Ohio State University, 1983</td>
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<td>Hueste, Marybeth D</td>
<td>Professor</td>
<td>Civil Engineering</td>
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<td>Electrical &amp; Computer Eng</td>
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<td>Associate Professor of the Practice</td>
<td>Engineering Student Serv &amp; Academic Prog</td>
<td>MS, University of Illinois at Urbana-Champaign, 2005</td>
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<td>Hufton, Amie J</td>
<td>Instructional Associate Professor</td>
<td>Liberal Studies</td>
<td>MMR, Texas A&amp;M University, 2010</td>
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<td>CERT, National Association of Underwater Instructors, 2006</td>
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<td>Hughbanks, Timothy R</td>
<td>Professor</td>
<td>Chemistry</td>
<td>PHD, Cornell University, 1983</td>
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<td>Hui, Jason C</td>
<td>Adjunct Assistant Professor</td>
<td>Restorative Sciences</td>
<td>DDS, Texas A&amp;M University, 2011</td>
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<td>Associate Professor</td>
<td>Performance Studies</td>
<td>PHD, University of Rochester, 2006</td>
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<td>Hung, Nguyen P</td>
<td>Associate Professor</td>
<td>Engineering Technology &amp; Industrial Dist</td>
<td>PHD, University of California, Berkeley, 1987</td>
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<td>Hunsucker, Bob C</td>
<td>Adjunct Assistant Professor</td>
<td>General Dentistry</td>
<td>DDS, Baylor College of Dentistry, 1989</td>
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<td>Hunter, Christopher S</td>
<td>Assistant Lecturer</td>
<td>Architecture</td>
<td>MS, Texas A&amp;M University, 2015</td>
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<td>Assistant Professor</td>
<td>Engineering Technology &amp; Industrial Dist</td>
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<td>Assistant Professor</td>
<td>Mechanical Engineering</td>
<td>PHD, University of Illinois at Urbana-Champaign, 2010</td>
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<td>Hurdle, Julian G</td>
<td>Associate Professor</td>
<td>Institute Of Biosciences &amp; Tech</td>
<td>PHD, University of Leeds, 2005</td>
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Hurlebaus, Stefan, Professor  
Civil Engineering  
PHD, University of Stuttgart, Germany, 2002

Hurst, Kenneth R, Assistant Lecturer  
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Hwang, Haeshin, Professor  
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Imhoff, Brian J, Associate Professor  
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Ing, Nancy H, Professor  
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Ingram, Julie A, Associate Professor of the Practice  
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Ioerger, Thomas R, Associate Professor  
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Ishdorj, Ariun, Associate Professor
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Ivanov, Ivan V, Clinical Associate Professor
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Jacob, John, Professor & Extension Specialist
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Jeong, Hae-Kwon, Associate Professor
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Jepson, Wendy E, Professor
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Jessup, Russell W, Associate Professor
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Jeter, Elizabeth A, Lecturer
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Jewell, Joseph O, Associate Professor
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Ji, Jim X, Professor
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PHD, University of Illinois at Urbana-Champaign, 2003

Ji, Jim X., Associate Professor
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PHD, University of Illinois at Urbana-Champaign, 2003

Ji, Jun-Yuan, Associate Professor
Molecular & Cellular Medicine
PHD, University of Washington, 2003

Jiang, Anxiao, Associate Professor
Computer Science & Engineering
PHD, California Institute of Technology, 2004
Jiang, Lin, Lecturer
Chemistry
PHD, Miami University, 2013

Jimenez, Daniel A, Professor
Computer Science & Engineering
PHD, The University of Texas at Austin, 2002

Jinadatha, Chetan, Clinical Associate Professor
Internal Medicine
MD, J.J.M. Medical College, 2001

Jing, Yan, Research Assistant Professor
Orthodontics
PHD, Sichuan University, 2014

Jo, Hyeran, Associate Professor
Political Science
PHD, University of Michigan, 2008

Jo, Javier A, Associate Professor
Biomedical Engineering
PHD, University of Southern California, 2002

Jochen, John E, Senior Lecturer
Petroleum Engineering
MS, Texas A&M University, 1993

Johansen Aase, Emily J, Associate Professor
English
PHD, McMaster University, 2008

Johnson, Andrew L, Associate Professor
Industrial & Systems Eng
PHD, Georgia Institute of Technology, 2006

Johnson, Carrie A, Clinical Assistant Professor
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DNP, The University of Texas Health Science Center at Houston, 2009

Johnson, Derek W, Lecturer
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PHD, Texas A&M University, 2014

Johnson, Gregory A, Professor
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PHD, University of Wyoming, 1997

Johnson, James S, Adjunct Professor
School Of Law
JD, Texas Wesleyan University School of Law, 2008

Johnson, Jeremy S, Visiting Assistant Professor
Geography
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Johnson, John W, Lecturer
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Johnson, Larry, Professor
Vet Integrative Biosciences
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Johnson, Mark C, Clinical Professor
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Johnson, Mark H, Associate Professor of the Practice
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MS, Central Michigan University, 1991

Johnson, Michael D, Associate Professor
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PHD, Massachusetts Institute of Technology, 2004

Johnson, Natalie M, Assistant Professor
Environmental And Occupational Health
PHD, Texas A&M University, 2010

Johnson, Richard G, Lecturer
Business Undergraduate Special Programs
MS, Texas A&M University, 2005

Johnson, Robert E, Clinical Associate Professor
Information & Operations Mgmt
PHD, University of Rochester, 1989

Johnson, Shane A, Professor
Finance
PHD, Louisiana State University, 1991

Johnson, Thomas S, Associate Professor Emeritus
Liberal Studies
PHD, The University of Texas at Austin, 1973

Johnson, Valen E, Professor
Statistics
PHD, University Of Chicago, 1989

Johnson, Violet M, Professor
Africana Studies
PHD, Boston College, 1992

Johnson, William B, Distinguished Professor
Mathematics
PHD, Iowa State University, 1969

Johnston, J S, Professor
Entomology
PHD, University of Arizona, 1972

Jolly, Ashley G, Assistant Lecturer
Teaching, Learning And Culture
MED, Sam Houston State University, 2007

Jones, Adam G, Professor
Biology
PHD, University of Georgia, 1998

Jones, Daniel H, Associate Professor
Vet Physiology & Pharmacology
PHD, University of Guelph, 1976

Jones, Daniel L, Professor
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DDS, Baylor College of Dentistry, 1989
PHD, Baylor University, 1978
Jones, Edward R, Executive Professor
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PHD, Virginia Polytechnic Institute and State University, 1976

Jones, Eli, Professor
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PHD, Texas A&M University, 1997

Jones, Glenn A, Professor
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Jones, Kathleen A, Clinical Associate Professor
Pathology and Laboratory Medicine
MD, Texas A&M University, 1994

Jones, Meredith L, Associate Professor
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MS, Oklahoma State University, 2006
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Jones, Robert T, Clinical Assistant Professor
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Jones-Mckyer, Ellisa L, Assistant Professor
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Jones-Schubart, Kara, Clinical Assistant Professor
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Joseph, Merlyn L, Clinical Assistant Professor
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Joshi, R M, Professor
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Josvoll, Kristin K, Lecturer
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Jourdan, Dawn E, Professor
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PHD, Florida State University, 2004
MUP, University of Kansas, 2000
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Julien, Katie C, Clinical Assistant Professor
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Jun, Mikyoung, Associate Professor
Statistics
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Jung, Jae Hoon, Research Assistant Professor
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Jung, Jiyoung, Adjunct Assistant Professor
Restorative Sciences
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Jung, Junehyuk, Assistant Professor
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Junkins, John L, Distinguished Professor
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Juntune, Joyce E, Instructional Professor
Educational Psychology
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Kabani, Faizan A, Associate Professor
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Kabir, Nurul, Adjunct Professor
Geology & Geophysics
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Kading, Cherri L, Clinical Assistant Professor
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Kahlig, Joseph E, Instructional Assistant Professor
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Kaihatu, James M, Associate Professor
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PHD, University of Delaware, 1994

Kainthla, Priyanka, Adjunct Assistant Professor
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Kaiser, Karl, Assistant Professor
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Kaiser, Ronald A, Professor
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LLM, University of California, Berkeley, 1989
JD, Thomas M. Cooley Law School, 1977

Kakosimos, Konstantinos E, Professor
Chemical Engineering Program
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Kalafatis, Stavros, Professor of the Practice
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MS, University of Arizona, 1991

Kalantar Mehrjardi, Negar, Assistant Professor
Architecture
PHD, Virginia Polytechnic Institute and State University, 2016
Kalbasi, Shaida, Instructional Assistant Professor
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Kallendorf, Craig W, Professor
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Kallendorf, Hilaire A, Professor
Hispanic Studies
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Kameoka, Jun, Professor
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Kam, Christina S, Assistant Professor
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Kane, Matthew H, Associate Professor
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Kang, Cong X, Associate Professor
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Kang, Ho-Yeong, Associate Professor
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Kanta, Lufthansa R, Instructional Assistant Professor
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Kao, Katy C, Associate Professor
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Kapler, Geoffrey, Professor
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Karaman, Ibrahim, Professor
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Karapisahi, Sena, Instructional Assistant Professor
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Karbowski, Steve W, Clinical Associate Professor
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MED, Sam Houston State University, 1997
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PHD, Virginia Commonwealth University, 2001

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PHD, Indian Institute of Technology, Kharagpur, 1992

Mahapatra, Rupak K, Professor
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PHD, University of Minnesota, Twin Cities, 2000

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MPH, University of North Carolina at Chapel Hill, 2000
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PHD, University of Canterbury, 1984

Maness, Robert S, Visiting Associate Professor
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Manjunath, Vikram, Assistant Professor
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Marcantonio, Franco, Professor
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Marcantonio, Janet G, Executive Professor
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PHD, New York University, 1999

Marchbanks III, Miner P., Lecturer
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Marianno, Craig M, Assistant Professor
Nuclear Engineering
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Marin Thornton, Gabriela, Instructional Associate Professor
International Affairs
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LLM, Modena State School of Archival Studies, 1997

Mark, Christine L, Clinical Assistant Professor
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MBA, University of Toledo, 1989

Mark, Samuel E, Professor
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Marine Biology
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Martin, Amy E, Professor
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PHD, Georgia Institute of Technology, 1964

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McCord, Carly, Visiting Lecturer
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McCord, Gary C, Clinical Professor
Neuroscience & Experimental Therapeutics
MD, The University of Texas Medical Branch at Galveston, 1983
McCrighth, Michael J, Lecturer
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McInnes, Kevin J, Professor
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McIntosh, William A, Professor
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McIntyre, David H, Lecturer
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McKnight, Thomas D, Professor
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Molecular & Cellular Medicine  
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PHD, University of Nevada, 2009

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PHD, The University of Alabama, 2007

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Newell-Fugate, Anne E, Assistant Professor
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Newman, Galen D, Associate Professor
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PHD, The University of Texas Medical School at San Antonio, 1973

Newman, Julie, Professor
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Civil Engineering  
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Paarlberg, Laurie E, Associate Professor  
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Pediatric Dentistry  
CERT, University at Buffalo School of Dental Medicine, 1979  
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Pacek, Alexander C, Professor  
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PHD, University of Illinois at Urbana-Champaign, 1991

Packard, Mark G, Professor  
Psychology  
PHD, McGill University, 1991
Padron, Yolanda, Professor
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Management
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Pagilla, Prabhakar R, Professor
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Palakurthi, Srinath, Professor
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PHD, Indian Institute of Chemical Technology, 2000

Palazzolo, Alan B, Professor
Mechanical Engineering
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Palmer, Clare A, Professor
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Palmer, Douglas J, Professor
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PHD, University of California, Los Angeles, 1977

Palmer, Erica O, Assistant Professor
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PHD, University of Minnesota, Twin Cities, 2010

Palos, Edward A, Clinical Assistant Professor
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Pals, Heili, Assistant Professor
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Panahi, Ladan M, Clinical Assistant Professor
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Panetta, Richard L, Professor
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Pangemanan, Adelaide P, Instructional Assistant Professor
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MS, State University of New York at Stony Brook, 2002

Panin, Vladislav M, Professor
Biochemistry & Biophysics
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Panina, Daria, Clinical Associate Professor
Management
PHD, Rutgers, The State University of New Jersey, 2002

Paouris, Grigorios, Professor
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Papanikolas, Matthew A, Professor
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Papovich, Casey J, Professor
Physics And Astronomy
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Pappas, Gregory F, Professor
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PHD, The University of Texas at Austin, 1990

Pappu, Madhav, Clinical Assistant Professor
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PHD, University of Tennessee, 1999

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Entomology
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Parihar, Arun, Lecturer
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Parish, Janet T, Clinical Professor
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Park, William D, Professor
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Parke, Frederic I, Professor
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Payne, Stephanie C, Professor
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Peacock, Walter G, Professor
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Penson, John B, Professor
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Pillai, Suresh D, Professor
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Pilling, Darrell, Research Assistant Professor
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Plisch, Andrew T, Assistant Professor
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Pitts, Jon T, Professor
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Plavnik, Julia Y, Visiting Assistant Professor
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Plunk, Michael D, Adjunct Assistant Professor
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Poiriot, Kristan A, Associate Professor
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PHD, Tomsk State University, 1957

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Polson, James R, Adjunct Assistant Professor
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Poltoratski, Alexei G, Professor
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PHD, California Institute of Technology, 1995

Poludnenko, Oleksiy Y, Associate Professor
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PHD, State University of New York at Buffalo, 1994

Polymenis, Michael S, Professor
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Pond, Amy, Assistant Professor
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Pooley, Alexandra, Instructional Assistant Professor
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Pope, Jeffrey D, Adjunct Assistant Professor
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Pope, Michael, Professor
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PHD, Virginia Polytechnic Institute and State University, 1995

Pope, Robert A, Clinical Assistant Professor
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Popescu, Sorin C, Professor
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PHD, Virginia Polytechnic Institute and State University, 2002

Popov, Bojan D, Professor
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Porter, Brian F, Clinical Associate Professor
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Porter, Jay R, Professor
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Portney, Kent E, Professor
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PHD, Florida State University, 1979

Posey, Richard D, Clinical Professor
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PHD, University of Oregon, 1968

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Price, Angie H, Associate Professor
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Price, Edwin C, Professor
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Performance Studies
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Marketing
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Mathematics
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Prockop, Darwin J, Professor
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PHD, Louisiana State University, 2001

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Entomology
PHD, Texas A&M University, 2008

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Diagnostic Sciences
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Pullak, Cemalettin M, Professor
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PHD, Texas A&M University, 1996

Pullen, Kirsten W, Professor
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Puller, Steven L, Professor
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Pustay, Michael W, Professor
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Puttaiah, Raghunath, Professor
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DDS, Baylor College of Dentistry, 1988

Qaraqe, Khalid A, Professor
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Quek, Francis K, Associate Professor
Visualization
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Quigg, Antonietta S, Professor
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Quinn, Michael D, Associate Professor of the Practice
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Quiram, Barbara, Professor
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Radzik, Linda C, Professor
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Ramanathan, Suresh, Professor
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Rambo, Lynne H, Professor
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Reed, David W, Professor
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Educational Psychology
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Hlth Promotion & Comm Hlth Sci
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Trache, Andreea, Associate Professor
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Orthodontics  
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Psychology  
PHD, The Catholic University of America, 1995

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Landscape Architecture & Urban Planning  
PHD, University of North Carolina at Chapel Hill, 2004  
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MS, Department of the Army, 1976

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Waite, Lucy J, Instructional Associate Professor
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Walling, Herbert M, Associate Professor of the Practice
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MS, Main Maritime Academy, 1987
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PHD, University of Southern California, 2008

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Molecular & Cellular Medicine
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Architecture
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Waren, Warren P, Instructional Assistant Professor
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Warren, Nancy B, Professor
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Health Policy & Management

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Washburn, Shannon E, Clinical Associate Professor
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Watson, Karan L, Professor
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Watson, Nancy T, Clinical Professor
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Watson, Patricia K, Instructional Assistant Professor
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Watson, Robert O, Assistant Professor
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Watson, Wesley T, Lecturer
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Watt, John D, Clinical Associate Professor
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Waxman, Herscholt C, Professor
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Weeks, Bradley R, Professor
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Weijermars, Rudy, Professor
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Welch, George R, Professor
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Welch, Jennifer L, Professor
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Wells, R.J. David, Associate Professor
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West, William F, Professor
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Whitten, Guy D, Professor
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Wilcox, Teresa G, Professor
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Wilkinson, Heather H, Professor
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Winking, Jeffrey W, Associate Professor  
Anthropology  
PHD, The University of New Mexico, 2005

Winzer-Serhan, Ursula, Associate Professor  
Neuroscience & Experimental Therapeutics  
PHD, University of Bremen, Germany, 1989

Wiseman, Melissa, Instructional Associate Professor  
Maritime Administration  
PHD, Texas A&M University, 1999

Withers, Michael C, Assistant Professor  
Management  
MBA, Arizona State University, 2011

Witherspoon, Sarah J, Professor  
Mathematics  
PHD, University of Chicago, 1994

Wolf, Charles M, Professor of the Practice  
Civil Engineering  
DEN, Texas A&M University, 2001

Wolf, Joan B, Professor  
Women and Gender Studies  
PHD, University of Chicago, 1997

Wolfe, Anna W, Assistant Professor  
Communication  
PHD, Ohio University, 2013

Wolfe, Christopher J, Professor  
Accounting  
PHD, Kent State University, 1984

Wolfe, Joda, Instructional Assistant Professor  
Health & Kinesiology  
MS, Ohio University, 2012

Wolken, Lawrence C, Senior Professor  
Finance  
PHD, Texas A&M University, 1972

Wollock, Jennifer G, Professor  
English  
PHD, Harvard University, 1981

Wolterring, Steven, Assistant Professor  
Educational Psychology  
PHD, University of Toronto, 2012

Womack, James E, Senior Distinguished Professor  
Veterinary Pathobiology  
PHD, Oregon State University, 1968

Won, Jae W, Assistant Lecturer  
Landscape Architecture & Urban Planning  
PHD, Texas A&M University, 2016

Wong, Lolo, Clinical Assistant Professor  
Pediatric Dentistry  
CERT, Texas A&M University, 2009  
DDS, Creighton University, 1990

Wood, Amanda L, Instructional Assistant Professor  
Ocean Engineering  
PHD, University of Houston, 2010

Wood, Billy D, Professor  
Political Science  
PHD, University of Houston, 1987

Wood, Gregory M, Lecturer  
Liberal Studies  
BS, Texas A&M University, 2003

Wood, Jonathan D, Instructional Assistant Professor  
Health & Kinesiology  
MS, Texas A&M University, 2010

Wood, Julia E, Assistant Professor  
History  
PHD, Yale University, 2011

Woodcock, David R, Adjunct Professor  
School Of Law  
JD, The University of Texas School of Law, 2000

Woodman, Christopher R, Associate Professor  
Health & Kinesiology  
PHD, University of Arizona, 1995

Woods, Timothy S, Instructional Associate Professor  
Sociology  
PHD, Texas A&M University, 2000
Woodward, Richard T, Professor
Agricultural Economics
PHD, University of Wisconsin - Madison, 1997

Woodward, Robert S, Clinical Associate Professor
Educational Psychology
PHD, Texas A&M University, 2004

Woody, Ronald D, Clinical Professor
Restorative Sciences
DDS, Marquette University School of Dentistry, 1963

Wooley, Karen L, Distinguished Professor
Chemistry
PHD, Cornell University, 1993

Wooley, James B, Professor
Entomology
PHD, University of California, Riverside, 1983

Woosley, James R, Instructional Professor
Health & Kinesiology
MS, Western Illinois University, 1975

Workman, Michael D, Clinical Assistant Professor
Educ Admn & Human Resource Dev
PHD, Georgia State University, 2000

Workman, Ronald L, Senior Lecturer
Construction Science
MS, Texas A&M University, 2002

Worthy, Darrell A, Associate Professor
Psychology
PHD, The University of Texas at Austin, 2010

Wortman, Martin A, Professor
Industrial & Systems Eng
PHD, Virginia Polytechnic Institute and State University, 1988

Wright, David L, Professor
Health & Kinesiology
PHD, The Pennsylvania State University, 1989

Wright, John M, Professor
Diagnostic Sciences
MS, Indiana University, 1977
DDS, West Virginia University, 1973

Wright, Lori E, Professor
Anthropology
PHD, University of Chicago, 1994

Wright, Nilah L, Instructional Associate Professor
Health & Kinesiology
PHD, Texas A&M University, 1998

Wright, Rachel N, Lab Instructor
Biology
PHD, Texas A&M University, 2011

Wright, Scott, Instructional Assistant Professor
Health & Kinesiology
MA, The University of Texas - Pan American, 1997

Wright, Steven M, Professor
Electrical & Computer Eng
PHD, University of Illinois at Urbana-Champaign, 1984

Wu, Chaodong, Associate Professor
Nutrition & Food Science
PHD, Beijing Medical University, 1998

Wu, Guoyao, Professor
Animal Science
PHD, University of Alberta, Canada, 1989

Wu, Hung-Jen, Assistant Professor
Chemical Engineering
PHD, Texas A&M University, 2006

Wu, Kan, Assistant Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 2014

Wu, Wei, Assistant Professor
Finance
PHD, University of Chicago, 2015

Wu, Wenhao, Associate Professor
Physics And Astronomy
PHD, University of Chicago, 1992

Wu, Ximing, Professor
Agricultural Economics
PHD, University of California, Berkeley, 2003

Wu, Xin, Research Assistant Professor
Neuroscience & Experimental Therapeutics
MD, Nantong Medical College, 1985

Wu, Xinyuan B, Professor
Ecosystem Science & Mgmt
PHD, University of Tennessee, 1991

Wunneburger, Douglas F, Instructional Associate Professor
Landscape Architecture & Urban Planning
PHD, Texas A&M University, 1992

Wurbs, Ralph A, Senior Professor
Civil Engineering
PHD, Colorado State University, 1978

Wyatt, Leigh A, Clinical Associate Professor
Dental Hygiene
MS, Texas A&M University Baylor College of Dentistry, 2014

Wylie, Wayne E, Associate Professor
Health & Kinesiology
PHD, University of Tennessee, 1981

Würsig, Bernd, Senior Professor
Marine Biology
PHD, State University of New York at Stony Brook, 1978

Xiang, Ping, Professor
Health & Kinesiology
PHD, Louisiana State University, 1996
Xiao, Yi, Associate Professor
Tamu Libraries
MLS, Emporia State University, 1993

Xiao, Yu, Associate Professor
Landscape Architecture & Urban Planning
MBA, University of Illinois at Urbana-Champaign, 2008

Xie, Le, Associate Professor
Electrical & Computer Eng
PHD, Carnegie Mellon University, 2009

Xie, Linglin, Assistant Professor
Nutrition & Food Science
PHD, Kansas State University, 2008

Xie, Zhigang, Research Assistant Professor
Molecular & Cellular Medicine
PHD, The University of Alabama at Birmingham, 2001

Xie, Zhizhang, Assistant Professor
Mathematics
PHD, The Ohio State University, 2011

Xiong, Zixiang, Professor
Electrical & Computer Eng
PHD, University of Illinois at Urbana-Champaign, 1996

Xu, Xiaohui, Associate Professor
Epidemiology & Biostatics
PHD, University of Pittsburgh, 2007

Xu, Yangyang, Associate Professor
Atmospheric Sciences
PHD, University of California, San Diego, 2014

Xu, Yi, Associate Professor
Institute Of Biosciences & Tech
PHD, The University of Texas Health Science Center at Houston, 1998

Yadav, Manjit S, Professor
Marketing
PHD, Virginia Polytechnic Institute and State University, 1990

Yakovlev, Vladimir V, Professor
Biomedical Engineering
PHD, Moscow State University, 1990

Yalvac, Bugrahan, Associate Professor
Teaching, Learning And Culture
PHD, The Pennsylvania State University, 2005

Yamauchi, Takashi, Associate Professor
Psychology
PHD, Columbia University, 1997

Yan, Huafei, Professor
Mathematics
PHD, Massachusetts Institute of Technology, 1997

Yan, Wei, Professor
Architecture
MA, University of California, Berkeley, 2004

Yancey, Thomas E, Professor
Geology & Geophysics
PHD, University of California, Berkeley, 1971

Yang, Ping, Professor
Atmospheric Sciences
PHD, University of Utah, 1995

Yang, Tian, Assistant Professor
Mathematics
PHD, Rutgers, The State University of New Jersey, 2013

Yang, Zheng Y, Professor
Tamu Libraries
MLS, University of Washington, 1990

Yanus, Margaret, Adjunct Assistant Professor
Restorative Sciences
MED, University of New Orleans, 1982

Yasskin, Philip B, Associate Professor
Mathematics
PHD, University of Maryland, 1979

Yazhari, Yasamin, Adjunct Assistant Professor
Restorative Sciences
DDS, The University of Texas Health Science Center at Houston, 2011

Yeager, Danny L, Professor
Chemistry
PHD, California Institute of Technology, 1975

Yeager, Katherine L, Adjunct Assistant Professor
Educ Admn & Human Resource Dev
PHD, Texas A&M University, 2013

Yeh, Alvin T, Associate Professor
Biomedical Engineering
PHD, University of California, Berkeley, 2000

Yennello, Sherry J, Professor
Chemistry
PHD, Indiana University, 1990

Yeoman, Michelle S, Lecturer
Vet Integrative Biosciences
MS, Texas A&M University, 2013
MS, Texas A&M University, 2012

Yi, Eunjeong, Professor
Liberal Studies
PHD, University of Houston, 2003

Ying, Qi, Associate Professor
Civil Engineering
PHD, University of California, Davis, 2004

Yoon, Byung-Jun, Associate Professor
Electrical & Computer Eng
PHD, California Institute of Technology, 2007

Yoon, Myeongsun, Associate Professor
Educational Psychology
PHD, Arizona State University, 2007
Yoon, So Yoon, Assistant Research Scientist
Engineering Student Serv & Academic Prog
PHD, Purdue University, 2011

York, Beverly D, Clinical Associate Professor
Restorative Sciences
DDS, Baylor College of Dentistry, 1981

Yorzinski, Jessica L, Assistant Professor
Wildlife & Fisheries Sciences
PHD, University of California, Davis, 2012

Younes, Khaled M, Adjunct Assistant Professor
Restorative Sciences
DDS, University of Science and Technology in Yemen, 2000

Young, James L, Adjunct Professor
School Of Law
JD, University of Houston, 1985

Young, Keith A, Professor
Psychiatry
PHD, The University of Texas at Austin, 1990

Young, Matthew P, Professor
Mathematics
PHD, Rutgers, The State University of New Jersey, 2004

Young, Michael K, Professor
International Affairs
JD, Harvard Law School, 1976

Young, Robin F, Professor
Molecular & Cellular Medicine
PHD, Vanderbilt University, 1988

Young, Ryland F, Professor
Biochemistry & Biophysics
PHD, The University of Texas at Dallas, 1975

Yu, Choongho, Associate Professor
Mechanical Engineering
PHD, The University of Texas at Austin, 2004

Yu, Guoliang, Professor
Mathematics
PHD, State University Of New York at Stony Brook, 1991

Yu, Ling, Research Associate Professor
Vet Physiology & Pharmacology
PHD, Nanjing Agricultural University, 2001

Yu, Peng, Assistant Professor
Electrical & Computer Eng
PHD, The University of Texas at Austin, 2009

Yu, Peter K, Professor
School Of Law
JD, Yeshiva University, 1999

Yu, Shilin, Visiting Assistant Professor
Mathematics
PHD, The Pennsylvania State University, 2013

Yuan, Shuhua, Professor
Plant Pathology & Microbiology
PHD, University of Tennessee, 2007

Yue, Jessica, Instructional Associate Professor
Educational Psychology
PHD, Virginia Polytechnic Institute and State University, 2011

Yum, Ki H, Senior Lecturer
Computer Science & Engineering
PHD, The Pennsylvania State University, 2016

Yust, Christopher G, Assistant Professor
Accounting
PHD, The University of Texas at Austin, 2015

Yvon-Lewis, Shari A, Professor
Oceanography
PHD, University of Miami, 1994

Zadeh, Jamshyd M, Adjunct Professor
School Of Law
JD, Southern Methodist University Dedman School of Law, 1988

Zandinejad, Amirali, Associate Professor
General Dentistry
DDS, Islamic Azad University, 1996

Zanwar, Preeti C, Instructional Assistant Professor
Epidemiology & Biostatics
PHD, The University of Texas at Austin, 2012

Zapata, Cindy P, Associate Professor
Management
PHD, University of Florida, 2008

Zapata, Gabriela C, Associate Professor
Hispanic Studies
PHD, The Pennsylvania State University, 2002

Zardkoohi, Asghar, Professor
Management
PHD, Virginia Polytechnic Institute and State University, 1977

Zartman, Justin A, Adjunct Professor
School Of Law
JD, Texas Wesleyan University, 2008

Zartman, Rosemarie R, Clinical Associate Professor
Restorative Sciences
MS, Baylor College of Dentistry, 2001
DDS, Baylor College of Dentistry, 1991

Zawadzki, Mary F, Instructional Assistant Professor
Visualization
PHD, The City University of New York, 2015

Zawieja, David C, Professor
Medical Physiology
PHD, The Medical College of Wisconsin, 1986

Zelenko, Igor, Associate Professor
Mathematics
PHD, Technion - Israel Institute of Technology, 2002
Zeng, Lanying, Assistant Professor
Biochemistry & Biophysics
PHD, University of Illinois at Urbana-Champaign, 2007

Zeng, Li, Assistant Professor
Industrial & Systems Eng
PHD, University of Wisconsin - Madison, 2009

Zhan, Hongbin, Professor
Geology & Geophysics
PHD, University of Nevada, Reno, 1996

Zhan, Wei, Associate Professor
Engineering Technology & Industrial Dist
PHD, Washington University in St. Louis, 1991

Zhang, Dan D, Professor
Educational Psychology
PHD, University of New Orleans, 1998

Zhang, Dekai, Associate Professor
Institute Of Biosciences & Tech
PHD, University of Hong Kong, 1995

Zhang, Hongbin, Professor
Soil & Crop Sciences
PHD, University of California, Davis, 1990

Zhang, Junjie, Assistant Professor
Biochemistry & Biophysics
PHD, Baylor College of Medicine, 2009

Zhang, Renyi, Professor
Atmospheric Sciences
PHD, Massachusetts Institute of Technology, 1994

Zhang, Shenyuan, Associate Professor
Medical Physiology
PHD, University of California, Irvine, 2005

Zhang, Xi, Professor
Electrical & Computer Eng
PHD, University of Michigan, 2002

Zhang, Xianyang, Assistant Professor
Statistics
PHD, University of Illinois at Urbana-Champaign, 2013

Zhang, Xiuren, Associate Professor
Biochemistry & Biophysics
PHD, Cornell University, 2003

Zhang, Xudong, Professor
Industrial & Systems Eng
PHD, University of Michigan, 1997

Zhang, Yige, Assistant Professor
Oceanography
PHD, Yale University, 2015

Zhang, Yu, Assistant Professor
Agricultural Economics
PHD, Texas A&M University, 2010

Zhang, Yuan, Visiting Assistant Professor
Mathematics
PHD, Duke University, 2015

Zhang, Yunlong, Professor
Civil Engineering
PHD, Virginia Polytechnic Institute and State University, 1996

Zhang, Yuzhe, Associate Professor
Economics
PHD, University of Minnesota, Twin Cities, 2006

Zhang, Zheng, Visiting Assistant Professor
Mathematics
PHD, Stony Brook University, 2014

Zhao, Hongwei, Professor
Epidemiology & Biostatics
PHD, Harvard University School of Public Health, 1997

Zhao, Hu, Assistant Professor
Restorative Sciences
DDS, University of California, Los Angeles, 2011
MS, University of Virginia, Charlottesville, 2003

Zheltikov, Alexey M, Professor
Physics And Astronomy
PHD, M.V. Lomonosov Moscow State University, 1999

Zheng, Fang, Assistant Professor
Economics
PHD, University of California, San Diego, 2015

Zheng, Qi, Associate Professor
Epidemiology & Biostatics
PHD, Texas A&M University, 1993

Zhong, Lixian, Assistant Professor
Pharmaceutical Sciences
PHD, Duke University, 2011

Zhou, Hongcai J, Professor
Chemistry
PHD, Texas A&M University, 2000

Zhou, Jianxin, Professor
Mathematics
PHD, The Pennsylvania State University, 1986

Zhou, Lan, Associate Professor
Statistics
PHD, University of California, Berkeley, 1997

Zhou, Yubin, Associate Professor
Institute Of Biosciences & Tech
PHD, Georgia State University, 2008

Zhu Salzman, Keyan, Professor
Entomology
PHD, Purdue University, 1994

Zhu, Ding, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1992

Zheng, Qi, Associate Professor
Epidemiology & Biostatics
PHD, Texas A&M University, 1993
Zhu, Guan, Professor
Veterinary Pathobiology
PHD, University of Georgia, 1993

Zhu, Lin, Assistant Professor
Pharmaceutical Sciences
PHD, University of Tennessee Health Science Center, 2010

Zhu, Xuemei, Associate Professor
Architecture
PHD, Texas A&M University, 2008

Zimmer, Mary R, Clinical Associate Professor
Marketing
PHD, The University of Texas at Austin, 1985

Zimmer, Warren E, Professor
Medical Physiology
PHD, Baylor College of Medicine, 1985

Zimmermann, Mark J, Adjunct Professor
School Of Law
JD, University of Virginia, 1975

Zoghi, Behbood B, Professor
Engineering Technology & Industrial Dist
PHD, Texas A&M University, 1993

Zoh, Roger S, Assistant Professor
Epidemiology & Biostatics
PHD, Iowa State University, 2012

Zollinger, Dan, Professor
Civil Engineering
PHD, University of Illinois at Urbana-Champaign, 1989

Zoran, Debra L, Professor
Vet Small Animal Clinical Sc
PHD, Texas A&M University, 1997
DVM, Kansas State University, 1984

Zoran, Mark J, Professor
Biology
PHD, Iowa State University, 1987

Zou, Jun, Professor
Electrical & Computer Eng
PHD, University of Illinois at Urbana-Champaign, 2002

Zou, Na, Instructional Assistant Professor
Industrial & Systems Eng
PHD, Arizona State University, 2015

Zubairy, Muhammad S, Professor
Physics And Astronomy
PHD, University of Rochester, 1979

Zubairy, Sarah, Assistant Professor
Economics
PHD, Duke University, 2010

Zuniga, Kelly J, Lecturer
Bush School Of Government & Public Svc
PHD, University of Houston, 2005

von Zharen, Wyndylyn, Senior Professor
Marine Sciences
DED, University of Florida, 1976
APPENDICES

- Rules and Regulations for Determining Residence Status (p. 1115)
- Texas Common Course Numbering System (p. 1115)
- Family Educational Rights and Privacy Act (p. 1118)
- International Agreements (p. 1120)
- Scholastic Honor Societies (p. 1123)
- Oak Ridge Associated Universities (p. 1124)
- Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (Clery Act) (p. 1124)
- Education Code - Hazing (p. 1124)

Rules and Regulations for Determining Residence Status

Determination of Residency for Tuition Purposes

In accordance with Texas Higher Education Coordinating Board Rules and pursuant to Texas Education Code, a student’s status as a resident, nonresident or international (foreign) student for tuition purposes will be determined in the Office of Admissions prior to enrollment. Students must be prepared to pay tuition and other required fees by specified due dates.

Students with a status of permanent resident of the United States are not automatically eligible as a Texas state resident for tuition purposes.

Students who have knowledge of an error in their residency status for tuition purposes are responsible for notifying the Office of the Registrar and may be required to submit the Core Residency Questions form, which is available for download on the Office of the Registrar (http://registrar.tamu.edu) website in order to amend their status.

Questions should be directed to the Residency Officer at (979) 845-1085 or email residency@tamu.edu. Complete rules and regulations are available on the Texas Higher Education Coordinating Board website.

Texas Common Course Numbering System

The Texas Common Course Numbering System (TCCNS) has been designed for the purpose of aiding students in the transfer of general academic courses between colleges and universities throughout Texas. Common courses are freshman and sophomore academic credit courses that have been identified as common by institutions that are members of the common course numbering system. The system ensures that if the student takes the courses the receiving institution designates as common, then the courses will be accepted in transfer and the credit will be treated as if the courses had actually been taken on the receiving institution’s campus.

The table below lists the courses Texas A&M University has identified as common and their TCCNS equivalents. Before using this table students should be sure that the institution they attend employs the TCCNS.

This table is revised quarterly in January, March, June, and September. The most recent version may be obtained from the Office of Admissions.

### Texas A&M and Texas Common Course Equivalents

<table>
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<th>Texas A&amp;M Course</th>
<th>TCCNS Equivalent Course</th>
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<td>ACCT 2402</td>
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<td>AGRI 1131</td>
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<td>AGRI 1231</td>
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<td>AGRI 2301</td>
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<td>AGRI 1119</td>
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<td>ANSC 107 and ANSC 108 General Animal Science</td>
<td>AGRI 1419</td>
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<td>ANTH 2346</td>
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<td>HUMA 2323</td>
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<td>ANTH 2302</td>
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<tr>
<td>ANTH 210 Social and Cultural Anthropology</td>
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<td>ARAB 101 Beginning Arabic I</td>
<td>ARAB 1411</td>
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<tr>
<td>ARAB 102 Beginning Arabic II</td>
<td>ARAB 1412</td>
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<tr>
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<td>ARAB 2311</td>
</tr>
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<td>ARCH 1301</td>
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<td>ARCH 1302</td>
</tr>
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<td>ARTS 1311</td>
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<td>ARTS 1316</td>
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<td>ARTS 1303</td>
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<td>ARTS 1304</td>
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<td>ASTR 1303 and ASTR 1103</td>
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The current version of this document may be found on the Office of Admissions (http://admissions.tamu.edu) website.
<table>
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<td>BIOL 1313 and BIOL 1113</td>
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<td>BIOL 1306 and BIOL 1106</td>
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<td>BIOL 1308 and 1108</td>
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<td>BIOL 2321 and BIOL 2121</td>
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<td>Beginning Chinese I</td>
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<td>Beginning Latin I</td>
<td>LATI 1411</td>
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<td>LATI 2311</td>
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<td>CLAS 222</td>
<td>Intermediate Latin II</td>
<td>LATI 2312</td>
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<td>Introduction to Communication</td>
<td>SPCH 1311</td>
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<td>COMM 203</td>
<td>Public Speaking</td>
<td>SPCH 1315</td>
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<tr>
<td>COMM 210</td>
<td>Group Communication and Discussion</td>
<td>SPCH 2333</td>
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<td>Argumentation and Debate</td>
<td>SPCH 2335</td>
</tr>
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<td>COSC 253</td>
<td>Construction Materials and Methods I</td>
<td>ARCH 2312</td>
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<td>CSCE 206</td>
<td>Structured Programming in C</td>
<td>COSC 1420</td>
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<tr>
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<td>Dairying</td>
<td>AGRI 1311</td>
</tr>
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<td>Ballet I</td>
<td>DANC 1241</td>
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<tr>
<td>ECON 202</td>
<td>Principles of Economics</td>
<td>ECON 2302</td>
</tr>
<tr>
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<td>Principles of Economics</td>
<td>ECON 2301</td>
</tr>
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<td>ENDS 101</td>
<td>Design Process</td>
<td>ARCH 1311</td>
</tr>
<tr>
<td>ENDS 115</td>
<td>Design Communication Foundations</td>
<td>ARCH 1307</td>
</tr>
<tr>
<td>ENDS 116</td>
<td>Design Communication Foundations II</td>
<td>ARCH 1308</td>
</tr>
<tr>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
<td>ENGL 1301</td>
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<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>ENGL 1302</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing</td>
<td>ENGL 2311</td>
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<tr>
<td>ENGL 221/MODL 221 World Literature</td>
<td>ENGL 2332</td>
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<td>ENGL 222/MODL 222 World Literature</td>
<td>ENGL 2333</td>
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<td>ENGL 227</td>
<td>American Literature: The Beginnings to Civil War</td>
<td>ENGL 2327</td>
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<td>ENGL 228</td>
<td>American Literature: Civil War to Present</td>
<td>ENGL 2328</td>
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<tr>
<td>ENGL 231</td>
<td>Survey of English Literature I</td>
<td>ENGL 2322</td>
</tr>
<tr>
<td>ENGL 232</td>
<td>Survey of English Literature II</td>
<td>ENGL 2323</td>
</tr>
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<td>ENGL 235</td>
<td>Elements of Creative Writing</td>
<td>ENGL 2307</td>
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<td>BUSI 1307</td>
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<td>Food Science</td>
<td>AGRI 1329</td>
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<td>Introduction to Human Geography</td>
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<td>Geography of the Global Village</td>
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<tr>
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<td>Planet Earth</td>
<td>GEOG 1301</td>
</tr>
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GEOL 101 Principles of Geology
GEOL 101 and 102 Principles of Geology
GEOL 102 Principles of Geology Laboratory
GEOL 106 Historical Geology
GERM 101 Beginning German I
GERM 102 Beginning German II
GERM 201 Intermediate German I
GERM 202 Intermediate German II
HIST 101 Western Civilization to 1660
HIST 102 Western Civilization Since 1660
HIST 103 World History to 1500
HIST 104 World History Since 1500
HIST 105 History of the United States
HIST 106 History of the United States
HIST 226 History of Texas
HLTH 216 First Aid
HLTH 231 Healthy Lifestyles
HORT 201 Horticultural Science and AGRI 1315 Practices
HORT 201 Horticultural Science and AGRI 1415 Practices
HORT 201 Horticultural Science and HORT 1301 Practices
HORT 202 Horticultural Science and HORT 1101 Practices Laboratory
HORT 202 Horticultural Science and AGRI 1115 Practices Laboratory
HORT 201 and HORT 202 Horticultural Science and Practices and Horticultural Science and Practices Laboratory
HORT 201 and AGRI 1415 Horticultural Science and Practices and Horticultural Science and Practices Laboratory
ITAL 101 Beginning Italian I
ITAL 102 Beginning Italian II
ITAL 201 Intermediate Italian I
ITAL 202 Intermediate Italian II
JAPN 101 Beginning Japanese I
JAPN 102 Beginning Japanese II
JOUR 102 American Mass Media
JOUR 203 Media Writing I
KINE 167 Visual and Performing Arts—Jazz Dance II
KINE 198 Health and Fitness Activity
KINE 199 Health and Fitness Activity
KINE 199 Required Physical Activity
KINE 199 Required Physical Activity
KINE 199 Required Physical Activity
KINE 213 Foundations of Kinesiology
KINE 214/HLTH 214 Health and Physical Activity for Children
KINE 215 Fundamentals of Coaching
MATH 102 Algebra
MATH 102 Algebra
MATH 140 Mathematics for Business and Social Sciences
MATH 142 Business Calculus
MATH 142 Business Calculus
MATH 150 Functions, Trigonometry and Linear Systems
MATH 151 Engineering Mathematics I
MATH 152 Engineering Mathematics II
MATH 253 Engineering Mathematics III
MGMT 105 Introduction to Business
MGMT 212 Business Law
MMET 105 Engineering Graphics
MMET 105 Engineering Graphics
MUSC 102 Fundamentals of Music
MUSC 102 Fundamentals of Music
MUSC 102 Fundamentals of Music
MUSC 201 Music and the Human Experience
MUSC 204 Music Theory I
MUSC 204 Music Theory I
MUSC 205 Music Theory II
MUSC 205 Music Theory II
MUSC 206 Music Theory III
MUSC 206 Music Theory III
MUSC 206 Music Theory III
MUSC 208 Musicianship I
MUSC 208 Musicianship I
MUSC 210 Musicianship II
MUSC 210 Musicianship II
MUSC 253 Individual Performance: Guitar I
MUSC 254 Individual Performance—Voice I
MUSC 255 Individual Performance—Keyboard I
Family Educational Rights and Privacy Act

Texas A&M University informs students annually of the Family Educational Rights and Privacy Act. This Act, with which the University intends to comply fully, is intended to protect the privacy of education records, to establish the rights of students to inspect and review their education records and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings. Students also have the right to file complaints with the Family Policy Compliance Office of the Department of Education in Washington, D.C. concerning alleged failures by the University to comply with the Act.

The Family Educational Rights and Privacy Act (FERPA) is a federal regulation that provides minimum standards for the management of student education records for universities receiving funds made available under any federal program administered by the U.S. Commissioner of Education. The Act provides, among other things, that an institution will maintain the confidentiality of student education records, and students will have the right to inspect their own education records.

This Policy is designed to meet FERPA provisions. Texas A&M University is committed to the good faith implementation of this Policy. Questions may be emailed to ferpa@tamu.edu.

If a student, the parent of a student, or any other individual has a complaint that an official of the University is violating FERPA, and the
complaint cannot be satisfactorily resolved within the University, that person has the right to file a complaint with the Department of Education by contacting:

Family Policy Compliance Office  
U.S. Department of Education  
400 Maryland Ave., S.W.  
Washington, D.C. 20202-5920

For the purposes of this Policy, Texas A&M University has used the following definitions of terms:

**Student.** Person who attends or has attended a program of instruction sponsored by Texas A&M University.

**Education Records.** Any records (in handwriting, print, tapes, film or other medium) maintained by the University, an employee of the University or agent of the University which is related to the student.

**Directory Information.** The following directory information may be made public unless the student desires to withhold any or all of this information: the student’s name, UIN (Universal Identification Number), local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study, classification, previous institution(s) attended, degrees received, honors and awards received, participation in officially recognized activities and sports, medical residence location (Health Science Center students), and medical residence specialization (Health Science Center students).

Currently enrolled students wishing to withhold any or all directory information items may do so by going to the My Record tab in the Howdy (https://howdy.tamu.edu) portal, clicking on "Withhold Directory Information" in the My Information channel and submitting a completed form.

Directory information may be released unless a Withhold Directory Information request is submitted by the student. The request remains in effect until the student revokes it or is deceased. Only currently enrolled students may request directory information be withheld.

**Statement of Rights**

Texas A&M University encourages students to exercise all of their rights under the Family Educational Rights and Privacy Act. Operating under the premise that the educational process is a cooperative venture between a student and the University, we emphasize the following rights of eligible students:

1. the right to inspect and review, with certain limited exceptions, the student’s educational records, including the right to receive explanations and interpretations of the records and to obtain copies of the records when such are needed to allow the student to effectively exercise his/her right of inspection and review;
2. the right to consent to disclosures of personally identifiable information contained in the student’s education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person or entity: (a) employed by the university or the university system in an administrative, supervisory, academic or research, or support staff position; (b) serving on a university governing body or duly authorized panel or committee; or (c) employed by or under contract to the university to perform a special task, function, or service for the university.

A school official has a legitimate educational interest if the information requested is necessary for that official to (a) perform appropriate tasks that are specified in his/her position description or in the performance of regularly assigned duties by a lawful supervisor; (b) fulfill the terms of a contractual agreement; (c) perform a task related to a student’s education; (d) perform a task related to the discipline of a student; or (e) provide a service or benefit relating to the student or student’s family, such as health care, counseling, financial aid, job placement, or former student-related activities.

Disclosure to a school official having a legitimate educational interest does not constitute university authorization to transmit, share, or disclose any or all information received to third parties unless such disclosure is permitted or required by law.

3. the right to correct a student’s education records when the records are inaccurate, misleading or otherwise in violation of FERPA;
4. the right to report violations of FERPA to the Department of Education;
5. the right to be informed about FERPA rights.

All the rights and protections given students under FERPA belong to the student. However, information in student records may be provided to parents/legal guardians without the written consent of the student if the eligible student is a financial dependent of his or her parents/legal guardians as defined under Section 152 of the Internal Revenue Code of 1954.

**Records Not Available for Information and Review**

Students shall have access to all education records concerning them maintained by the University with the exception of the following:

1. A personal record kept by a university faculty or staff member which meets the following tests:
   a. It is in the personal possession of the individual who made it.
   b. Information contained in it has never been revealed or made available to any other person except the maker’s temporary substitute.

2. An employment record which is used in relation to a student’s employment by the University, except where an individual in attendance at the University is employed as a result of his or her status as a student.

3. Records relating to a student which are created or maintained by a physician, psychiatrist, psychologist or other recognized professional or para-professional acting in his or her professional or para-professional capacity or assisting in that capacity which are used in connection with the provision of treatment to a student and are not disclosed to anyone other than the individuals providing the treatment.

4. Financial records and statements of a student’s parents.

5. Confidential letters and statements of recommendation which were placed in the education records of a student prior to January 1, 1975.

6. Confidential letters and statements of recommendation which were placed in the education records of a student on or after January 1,
International Agreements

In order to help internationalize the campus and create significant global opportunities for our students and faculty, Texas A&M University has active, formal agreements with foreign institutions as well as Reciprocal Educational Exchange Programs (REEP). For information regarding international Partnerships visit the Global Partnership Services (http://globalsupport.tamu.edu) website or call Public Partnership & Outreach, Global Partnerships office at 979.845.3099. For updated information on global engagement please visit globalsupport.tamu.edu.

All current (as of March 2016) agreements with foreign institutions are as follows:

**Argentina**
- Universidad del Salvador\(^1\) (2014)
- Universidad Nacional del Comahue (2016)

**Armenia**
- Armenian State Agrarian University (2012)

**Austria**
- MCI Management Center Innsbruck\(^1\)

**Australia**
- Queensland University of Technology\(^1\) (2001)
- University of Adelaide\(^1\) (2010)
- University of New South Wales\(^1\) (2014)
  - Australian Defence Academy
- University of Queensland\(^1\) (2012)
- University of Sydney\(^1\) (2016)

**Brazil**
- Fundação Getulio Vargas\(^1\) (2015)
- Pontificia Universidad Católica de Rio de Janeiro\(^1\) (2013)
- Prodttare Consutores Associados (2014)
- Universidade Federal de Alfenas (2015)
- Universidade de São Paulo (2007)
- Universidade de São Paulo en Sao Carlos\(^1\) (2014)
- Universidade Estadual de Ponta Grossa (2012)
- Universidade Estadual Paulista (1989)
- Universidade Federal de Pernambuco\(^1\) (2011)
- Universidade Federal de ViCosa (1989)
- Universidade Federal do Rio de Janeiro (UFRJ)\(^1\) (2011)
- Universidade Federal Rural de Pernambuco (2012)

**Canada**
- Carleton University\(^1\) (2012)

**Chile**
- Pontificia Universidad Católica de Chile (2011)

**China**
- Beihang University (2014)
- Beijing Jiaotong University\(^1\) (2009)
- Capital University of Economics and Business (2015)
- Fujian Agriculture & Forestry University (2012)
- Harbin Engineering University (2006)
- Harbin Institute of Technology (2014)
- Hong Kong University of Science and Technology\(^1\) (2001)
- Nanjing Medical College\(^1\) (1988)
- Nanjing University of Science and Technology (2013)
- Ocean University of China (2006)
- Peking University\(^1\) (1992)
- Renmin University of China (2015)
Shanghai Institute for International Studies\(^1\) (2012)
Southwest University (2015)
Southwestern University of Finance and Economics\(^1\) (2011)
Tianjin University (1995)
Tongji University (2014)
University of Electronic and Science and Technology of China (2014)
University of Nottingham, Ningbo\(^1\) (2014)
Wuhan University (2014)

Colombia
Universidad Autónoma de Bucaramanga (2014)
Universidad Del Magdalena (2011)

Costa Rica
Universidad de Costa Rica (2016)
Universidad Nacional de Costa Rica (2016)

Cyprus
University of Cyprus (2014)

Czech Republic
Prague University of Economics\(^1\) (2016)

Denmark
Copenhagen Business School\(^1\) (2002)
Danmarks Tekniske Universitet\(^1\) (DTU) (2016)

Ecuador
Universidad San Francisco de Quito\(^1\) (2004)
University of Cuenca (2015)

Egypt
Beni-Suef University (2016)
British University of Egypt (2010)

Finland
Aalto University\(^1\) (2016)
Hanken Svenska Handelshögskolan\(^1\) (2015)

France
École le de Management Strasbourg\(^1\) (1999)
École Superieure d'Ingénieurs de Luminy\(^1\) (2010)
EDHEC Business School\(^1\) (1998)
EMLYON Business School (École De Management De Lyon)\(^1\) (2003)
Fédération Des École Supérieures d'ingénieurs en Agriculture (FESIA)\(^1\) (1998)
Institut National Polytechnique Toulouse (2013)
Université de Caen\(^1\) (2004)
Université de Strasbourg\(^1\) (2010)

Germany
Clausthal University of Technology\(^1\) (2002)
Eberhard Karls Universität Tübingen\(^1\) (2002)
European Business School Universität\(^1\) (2008)
Helmut Schmidt Universität\(^1\) (2012)
Munich Business School (2012)
Universität Hohenheim\(^1\) (2011)
University of Applied Sciences\(^1\) (2005)
WHU Otto Beisheim School of Management - Koblenz\(^1\) (1986)

Greece
American Farm School (2012)
Aristotle University of Thessaloniki (2011)
Eastern Macedonia and Thrace Institute of Technology (2013)
Ethniko Metsovio Polytechnio (NTUA) (2015)
University of Ioannina (2014)

India
Bangalore University, Jnanabharathi Campus (2016)
Indian Institute of Management Bangalore (IIMB)\(^1\) (2001)
Indian Institute of Management Kozhikode (IIMK)\(^1\) (2016)
Indian Institute of Technology Hyderabad (2014)
Indian Institute of Technology Kanpur (2013)
Indian Institute of Technology Kharagpur (2015)
Jindal School of International Affairs\(^1\) (2012)
Pandit Deendayal Petroleum University (2010)
Rajiv Gandhi Institute for Petroleum Technology (2013)
RICS School of Built Environment Amity University (2016)
SDM Institute for Management Development\(^1\) (2008)
University of Agricultural Sciences – Dharwad (2003)
University of Horticultural Sciences (2010)

Indonesia
Institut Teknologi Bandung (2014)
International Agreements

University Gadjah Mada (2014)

Ireland
University College Dublin, National University of Ireland¹ (2012)
University of Limerick¹ (2016)

Israel
University of Haifa (2015)

Italy
Politecnico di Torino (2014)
Universitá Commerciale ‘Luigi Bocconi’ di Milano¹ (2014)
Università degli Studi di Siena (2014)
Università degli Studi di Trieste (2014)
Università degli Studi di Torino (2014)
Università degli Studi ‘Ca’ Foscari’ di Venezia (2015)
Università degli Studi di Bologna ‘Alma Mater Studiorum’¹ (2016)
Università degli Studi di Padova (2011)

Japan
Kwansei Gakuin University¹ (2011)
Kyushu University (2015)
Kyoto Bunkyo University (1999)
Osaka University¹ (2001)
Saitama University (2015)
Waseda University (2015)

Jordan
German Jordanian University (2015)

Kazakhstan
L.N. Gumilyov Eurasian National University (2015)

Republic of Korea
Chungnam National University¹ (2015)
Inha University (2015)
Korea Advanced Institute of Science and Technology (2013)
Republic of Korea Army¹ (2013)
Seoul National University¹ (1997)
Soonchunhyang University¹ (1999)

Mexico
Benemérita Universidad Autónoma de Puebla (2012)

Centro de Investigación y Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV) (2015)
Consejo Nacional de Ciencia y Tecnología (CONACYT) (2012)
Fundación Universidad de las Américas, Puebla¹ (2013)

Mongolia
Mongolian Prosecutors Office (2016)

Namibia
University of Namibia (2010)

Netherlands, The
Erasmus School of Economics¹ (2012)
Tilburg University¹ (2012)
Universiteit Maastricht¹ (1998)

New Zealand
Victoria University of Wellington¹ (2008)

Nigeria
University of Ilorin (2011)

Norway
BI Norwegian School of Management¹ (2001)
University of Stavanger (2003)

Panama
International Maritime University (2013)

Peru
Centro de Ornitología y Bioversidad (CORBIDI) (2013)
Universidad Nacional de Ingeniería (2014)
Universidad Peruana Cayetano Heredia (2007)

Poland
Politechnika Gdanska (2015)

Wroclaw University of Science and Technology (2016)
Qatar
Qatar University (2005)

Romania
Universitatea Tehnica din Cluj-Napoca (2014)

Russia
National Research Tomsk Polytechnic University (2012)

Saudi Arabia
King Abdullah University of Science and Technology (2015)

Singapore
National University of Singapore (1996)

Spain
Abat Oliba CEU University (2013)
Universidad Autónoma de Barcelona (2005)
Universidad Carlos III de Madrid (1998)
Universidad de Córdoba (2006)
Universidad de Jaén (2016)
Universitat Pompeu Fabra (1998)
Zaragoza Logistics Center (2012)

South Africa
Department of Rural Development & Agrarian Reform (2015)

Sweden
Jönköping International Business School (2001)

Switzerland
Universite De Lausanne (2001)

Taiwan
National Taiwan University (2000)

Thailand
Kasetsart University (2016)

Turkey
Koc University (2015)

United Arab Emirates
Khalifa University of Science, Technology and Research (KUSTAR) (2015)

United Kingdom
Lancaster University (2013)
Swansea University (2010)
University of Aberdeen (2015)
University of Leicester (2007)
University of Nottingham (2002)

1 Agreement includes a REEP.

Scholastic Honor Societies
Alpha Epsilon Delta — Premedical/Predental
Alpha Eta Mu Beta — Bioengineering
Alpha Kappa Delta — Sociology
Alpha Nu Sigma — Nuclear Science
Alpha Pi Mu — Industrial Engineering
Alpha Zeta — Agriculture
Chi Epsilon — Agriculture
Eta Kappa Nu — Electrical Engineering
Eta Sigma Gamma — Health Education
Kappa Delta Pi — Education
Kappa Theta Epsilon — Cooperative Education
Lambda Sigma — Sophomores
Lambda Pi Eta — Communication
National Society of Collegiate Scholars — Freshmen and Sophomores
Omega Chi Epsilon — Chemical Engineering
Omega Epsilon — Ocean Engineering
Phi Alpha Theta — History (international)
Phi Eta Sigma — Freshmen
Pi Alpha Xi — Floriculture
Pi Epsilon Tau — Petroleum Engineering
Pi Mu Epsilon — Mathematics
Pi Tau Sigma — Mechanical Engineering
Psi Chi — Psychology
Sigma Alpha Lambda — Undergraduate
Sigma Delta — Industrial Distribution
Sigma Delta Pi — Hispanic
Sigma Gamma Tau — Aerospace Engineering
Sigma Lambda Chi — Construction Science
Sigma Tau Delta — English
Tau Alpha Pi — Engineering Technology
Tau Beta Pi — Engineering
Oak Ridge Associated Universities (ORAU)

Since 1950, students and faculty of Texas A&M University have benefited from membership in Oak Ridge Associated Universities (ORAU). A consortium of 121 Ph.D.-granting universities across the United States, the United Kingdom, and Puerto Rico, ORAU provides research grants; promotes opportunities for collaboration among government, universities, and private industry; and creates smart partnerships for innovation and advances in scientific research and education. ORAU leverages this strong university by partnering with national laboratories, government agencies, and private industry to strengthen America's scientific research and education enterprise to enhance global competitiveness, to build public confidence in the management of health issues and environmental cleanup initiatives, and to enhance our nation's preparedness to respond to emergencies related to terrorist incidents and natural disasters.

ORAU operates the Oak Ridge Institute for Science and Education (ORISE), a Department of Energy facility that provides access to a multitude of opportunities for study and research for undergraduates, graduates, postgraduates, and faculty. Students can participate in programs covering a wide variety of disciplines, including business, Earth Sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the ORISE Catalog of Education and Training Programs, available at http://see.orau.org or by calling the contact below.

ORAU’s Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU’s members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, which provide seed money for research by junior faculty at ORAU member institutions and are intended to enrich the research and professional growth of young faculty and result in new funding opportunities: the ORAU Events Sponsorship Program, which provides support for events that involve participants from more than one ORAU institution; the ORAU Travel Grants Program, which facilitates travel by a faculty or staff member from an ORAU sponsoring or associate institution; and various other support programs and services.

For more information about ORAU and its programs, visit www.orau.org or contact:

Karen L. Butler-Purry
Interim Vice President for Research
ORAU Councilor for Texas A&M University
(979) 845-8585

Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (Clery Act)

In compliance with federal law, the following information is maintained and available through the Clery Annual Reports webpage on the Texas A&M University Risk and Compliance website. The Texas A&M University Annual Security Reports and Annual Fire Safety Reports are available and include information on campus safety and security policies and statistics. Policies include: reporting crimes and emergencies, security resources, crime awareness and prevention, security of campus facilities and residence halls, alcohol and drug policies, and fire safety systems for on-campus student housing facilities.

The Texas A&M University Annual Security Reports and Annual Fire Safety Reports can be found at: http://urc.tamu.edu/clery-act/clery-annual-reports/.

For a paper copy of the reports, please contact the prospective campus as indicated in the following: http://urc.tamu.edu/media/519551/notification_security_fire_reports.pdf.

Higher Education Campus Fire Safety Standards and Measures

In compliance with federal law, the following information is maintained and available through Environmental Health and Safety as listed below.

Campus Fire Statistics and Fire Safety Policies

An annual campus housing fire safety report is available that includes information on fire safety systems and fire statistics for on-campus student housing facilities. The Annual Fire Safety Report on Student Housing is available at this website (https://ehsd.tamu.edu/Pages/FireLifeSafety.aspx). A paper copy is available upon request at the address below.

Environmental Health and Safety
4472 TAMU
College Station, Texas 77843-4472
http://ehsd.tamu.edu

Education Code - Hazing

Education Code § 51.936 requirement to publish a summary of Education Code Ch. 37, subchapter F. Hazing in the University Catalog

The following is a summary of Chapter 37, subchapter F. (§§ 37.151-157) of the Texas Education Code, which prohibits hazing in Texas public or private high schools. Texas Education Code §51.936 applies Ch. 37’s prohibition on hazing to institutions of higher education. This summary of Chapter 37 is provided as required by § 51.936(d).

Summary

Hazing is a criminal violation under Texas law. A person may be found guilty of criminal conduct for hazing, encouraging hazing, permitting hazing, or having knowledge of the planning of hazing incidents and failure to report in writing his/her knowledge to the Dean of Students.

Both failing to report hazing and hazing that does not result in serious bodily injury are Class B misdemeanors. Hazing that results in serious bodily injury is a Class A misdemeanor. Hazing resulting in a death is a state jail felony. An organization found guilty of hazing may be fined $5,000 to $10,000 or, for incidents causing personal injury or property damage, an amount double the loss or expenses incurred because of the
hazing incident. It is not a defense to prosecution that the person hazed consented to the hazing activity.

Any person reporting a specific hazing incident to the Dean of Students or other appropriate institutional official is immune from civil and criminal liability unless the report is in bad faith or malicious.

The state law does not limit or affect an educational institution’s right to enforce its own penalties against hazing.

The Education Code defines hazing as “any intentional, knowing, or reckless act occurring on or off the campus of an educational institution, by one person or acting with others, directed against a student, that endangers the mental or physical health or safety of a student for the purpose of pledging, being initiated into, affiliating with, holding office in, or maintaining membership in an organization.” The statute contains a list of conduct which constitutes hazing.

In order to report suspected incidents of hazing, please contact either the Office of the Dean of Student Life at (979) 845-3111 or the Texas A&M University Police Department at (979) 845-2345. For information on how to report suspected incidents of hazing, go to http://stophazing.tamu.edu/report
### Index

#### A

<p>| AALO - Arabic &amp; Asian Language (AALO) | 697 |
| Accounting | 244 |
| Accounting - BBA | 246 |
| Accounting - 5-Year Bachelor of Business Administration/Master of Financial Management | 248 |
| Accounting - 5-Year Bachelor of Business Administration/Master of Science | 249 |
| ACCT - Accounting (ACCT) | 697 |
| Admission | 45 |
| Advertising Strategy - Certificate | 281 |
| AERO - Aerospace Engineering (AERO) | 699 |
| Aerospace Engineering | 350 |
| Aerospace Engineering - BS | 353 |
| Aerospace Engineering - Minor | 354 |
| Aerospace Studies | 657 |
| AERS - Aerospace Studies (AERS) | 702 |
| Africana Studies Minor | 477 |
| AFST - Africana Studies (AFST) | 703 |
| AGCJ - Ag Comm &amp; Journalism (AGCJ) | 705 |
| AGEC - Agricultural Economics (AGEC) | 707 |
| AGLS - Ag &amp; Life Sciences (AGLS) | 711 |
| Agribusiness | 120 |
| Agribusiness Entrepreneurship - Minor | 128 |
| Agricultural Communications and Journalism - BS | 132 |
| Agricultural Communications and Journalism - Minor | 135 |
| Agricultural Economics | 118 |
| Agricultural Economics - 5-Year Bachelor of Service Administration | 126 |
| Agricultural Economics - BS, Finance and Real Estate Option | 122 |
| Agricultural Economics - BS, Food Marketing Systems Option | 123 |
| Agricultural Economics - BS, Policy and Economic Analysis Option | 124 |
| Agricultural Economics - BS, Rural Entrepreneurship Option | 125 |
| Agricultural Economics - Minor | 129 |
| Agricultural Leadership and Development - BS | 133 |
| Agricultural Leadership, Education, and Communications | 131 |
| Agricultural Science - BS | 134 |
| Agricultural Systems Management - BS | 147 |
| Agricultural Systems Management - Minor | 150 |
| AgriFood Sales - Minor | 129 |
| AGRO - Agronomy (AGRO) | 711 |
| Agronomy - Minor | 200 |
| AGSC - Agricultural Science (AGSC) | 711 |
| AGSM - Agricultural Systems Mgmt (AGSM) | 712 |
| ALEC - Ag Leadshp, Ed &amp; Comm (ALEC) | 714 |
| ALED - Ag Leadership &amp; Dev (ALED) | 715 |
| Analysis, Design and Management of Energy Conversion Systems - Minor | 411 |
| Analytics and Consulting - Certificate | 281 |
| Animal Science | 137 |
| Animal Science - BS, Production/Industry Option | 138 |
| Animal Science - BS, Science Option | 140 |
| ANSC - Animal Science (ANSC) | 717 |
| ANTH - Anthropology (ANTH) | 721 |
| Anthropology | 484 |
| Anthropology - BA | 486 |
| Anthropology - BA, Archaeology Track | 485 |
| Anthropology - Minor | 487 |
| Appendices | 1115 |
| Applied Behavioral Health - Certificate | 552 |
| Applied Mathematical Sciences - 5-Year BS/MS | 625 |
| Applied Mathematical Sciences - BS, Actuarial Emphasis | 617 |
| Applied Mathematical Sciences - BS, Biological Science Emphasis | 618 |
| Applied Mathematical Sciences - BS, Computational Emphasis | 619 |
| Applied Mathematical Sciences - BS, Economics Emphasis | 621 |
| Applied Mathematical Sciences - BS, Math Emphasis | 622 |
| Applied Mathematical Sciences - BS, Statistics Emphasis | 624 |
| ARAB - Arabic (ARAB) | 725 |
| Arabic Studies - Minor | 535 |
| ARCH - Architecture (ARCH) | 726 |
| Architectural Fabrication and Product Design - Minor | 216 |
| Architectural Heritage Conservation - Minor | 216 |
| Architecture | 212 |
| Art - Minor | 233 |
| Art and Architecture History - Minor | 216 |
| ARTS - Art (ARTS) | 729 |
| ASIA - Asian Studies (ASIA) | 731 |
| Asian Studies - Minor | 535 |
| ASTR - Astronomy (ASTR) | 732 |
| Astrophysics - Minor | 639 |
| ATMO - Atmospheric Sciences (ATMO) | 733 |
| Atmospheric Sciences | 434 |
| ATTR - Athletic Training (ATTR) | 734 |
| BAEN - Biological &amp; Ag Engr (BAEN) | 735 |</p>
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>432</td>
<td>Communication - Minor ....................................................................</td>
</tr>
<tr>
<td>493</td>
<td>Communication and Global Media - Certificate ................................</td>
</tr>
<tr>
<td>494</td>
<td>Communication Leadership and Conflict Management - Certificate .......</td>
</tr>
<tr>
<td>309</td>
<td>Community Health - BS .....................................................................</td>
</tr>
<tr>
<td>194</td>
<td>Community Recreation and Park Administration - Certificate ...............</td>
</tr>
<tr>
<td>478</td>
<td>Comparative Cultural Studies International - Minor .........................</td>
</tr>
<tr>
<td>479</td>
<td>Comparative Cultural Studies U.S. - Minor .......................................</td>
</tr>
<tr>
<td>384</td>
<td>Computer Engineering - BS, Computer Science Track ..........................</td>
</tr>
<tr>
<td>388</td>
<td>Computer Engineering - BS, Electrical Engineering Track .................</td>
</tr>
<tr>
<td>386</td>
<td>Computer Science - BS .....................................................................</td>
</tr>
<tr>
<td>387</td>
<td>Computer Science - Minor ..................................................................</td>
</tr>
<tr>
<td>218</td>
<td>Construction Science ........................................................................</td>
</tr>
<tr>
<td>220</td>
<td>Construction Science - BS ..................................................................</td>
</tr>
<tr>
<td>411</td>
<td>Control of Mechanical Systems - Minor ............................................</td>
</tr>
<tr>
<td>765</td>
<td>COSC - Construction Science (COSC) ................................................</td>
</tr>
<tr>
<td>697</td>
<td>Course Descriptions .........................................................................</td>
</tr>
<tr>
<td>302</td>
<td>Creative Studies - Certificate ..........................................................</td>
</tr>
<tr>
<td>301</td>
<td>Creative Studies - Minor ....................................................................</td>
</tr>
<tr>
<td>768</td>
<td>CSCE - Computer Sci &amp; Engr (CSCE) ...................................................</td>
</tr>
<tr>
<td>772</td>
<td>CVEN - Civil Engineering (CVEN) ........................................................</td>
</tr>
<tr>
<td>346</td>
<td>Cybersecurity - Minor .......................................................................</td>
</tr>
<tr>
<td>326</td>
<td>Dance - Minor ...................................................................................</td>
</tr>
<tr>
<td>775</td>
<td>DASC - Dairy Science (DASC) .............................................................</td>
</tr>
<tr>
<td>403</td>
<td>Data Center Operations Engineering - Certificate ...............................</td>
</tr>
<tr>
<td>776</td>
<td>DCED - Dance Education (DCED) ..........................................................</td>
</tr>
<tr>
<td>777</td>
<td>DDDS - Doctor Dental Surgery (DDDS) ................................................</td>
</tr>
<tr>
<td>778</td>
<td>DDHS - Dental Hygiene (DDHS) .............................................................</td>
</tr>
<tr>
<td>27</td>
<td>Degree Information ............................................................................</td>
</tr>
<tr>
<td>286</td>
<td>Dental Hygiene - BS ..........................................................................</td>
</tr>
<tr>
<td>411</td>
<td>Design and Simulation of Mechanical Systems - Minor .........................</td>
</tr>
<tr>
<td>780</td>
<td>DIVE - Diving Tech and Methods (DIVE) ..............................................</td>
</tr>
<tr>
<td>212</td>
<td>Diversity - Certificate .......................................................................</td>
</tr>
<tr>
<td>484</td>
<td>Diversity - Certificate .......................................................................</td>
</tr>
<tr>
<td>434</td>
<td>Diversity Certificate .........................................................................</td>
</tr>
<tr>
<td>669</td>
<td>Diving Technology and Methods - Minor ..............................................</td>
</tr>
<tr>
<td>432</td>
<td>Earth Sciences - Minor ......................................................................</td>
</tr>
<tr>
<td>781</td>
<td>ECEN - Electrical &amp; Comp Engr (ECEN) ...............................................</td>
</tr>
<tr>
<td>785</td>
<td>ECH-Early Chldhd Ed Fld Based (ECEE) ...............................................</td>
</tr>
<tr>
<td>786</td>
<td>ECMT - Econometrics (ECMT) ..............................................................</td>
</tr>
<tr>
<td>151</td>
<td>Ecological Restoration - BS ...............................................................</td>
</tr>
<tr>
<td>786</td>
<td>ECON - Economics (ECON) ..................................................................</td>
</tr>
<tr>
<td>495</td>
<td>Economics .........................................................................................</td>
</tr>
<tr>
<td>498</td>
<td>Economics - 5-Year BA/MIA ...............................................................</td>
</tr>
<tr>
<td>499</td>
<td>Economics - 5-Year BA/MPSA .............................................................</td>
</tr>
<tr>
<td>500</td>
<td>Economics - 5-Year BS/MIA ...............................................................</td>
</tr>
<tr>
<td>501</td>
<td>Economics - 5-Year BS/MS .................................................................</td>
</tr>
<tr>
<td>497</td>
<td>Economics - BA ................................................................................</td>
</tr>
<tr>
<td>498</td>
<td>Economics - BS .................................................................................</td>
</tr>
<tr>
<td>503</td>
<td>Economics - Minor .............................................................................</td>
</tr>
<tr>
<td>150</td>
<td>Ecosystem Science and Management ....................................................</td>
</tr>
<tr>
<td>788</td>
<td>EDCI - Educ Curriculum &amp; Dev (EDCI) ................................................</td>
</tr>
<tr>
<td>789</td>
<td>EDTC - Educational Technology (EDTC) ..............................................</td>
</tr>
<tr>
<td>1124</td>
<td>Education Code - Hazing ...................................................................</td>
</tr>
<tr>
<td>291</td>
<td>Educational Administration and Human Resource Development ..............</td>
</tr>
<tr>
<td>296</td>
<td>Educational Psychology .....................................................................</td>
</tr>
<tr>
<td>789</td>
<td>EHHR - Ed Human Res Develop (EHHR) ...............................................</td>
</tr>
<tr>
<td>388</td>
<td>Electrical and Computer Engineering ................................................</td>
</tr>
<tr>
<td>390</td>
<td>Electrical Engineering - BS ...............................................................</td>
</tr>
<tr>
<td>391</td>
<td>Electrical Engineering - Minor ..........................................................</td>
</tr>
<tr>
<td>393</td>
<td>Electronic Systems Engineering Technology - BS ................................</td>
</tr>
<tr>
<td>399</td>
<td>Embedded Systems Integration Minor ................................................</td>
</tr>
<tr>
<td>791</td>
<td>ENDG - Enr Design Graphics (ENDG) ..................................................</td>
</tr>
<tr>
<td>791</td>
<td>ENDS - Environmental Design (ENDS) .................................................</td>
</tr>
<tr>
<td>249</td>
<td>Energy Accounting - Certificate .......................................................</td>
</tr>
<tr>
<td>421</td>
<td>Energy Engineering - Certificate ......................................................</td>
</tr>
<tr>
<td>349</td>
<td>Engineering Honors - Certificate ......................................................</td>
</tr>
<tr>
<td>349</td>
<td>Engineering Leadership - Certificate ...............................................</td>
</tr>
<tr>
<td>347</td>
<td>Engineering Project Management - Minor ..........................................</td>
</tr>
<tr>
<td>403</td>
<td>Engineering Systems Management - Certificate ...................................</td>
</tr>
<tr>
<td>392</td>
<td>Engineering Technology and Industrial Distribution ............................</td>
</tr>
<tr>
<td>359</td>
<td>Engineering Therapeutics Manufacturing - Certificate .........................</td>
</tr>
<tr>
<td>792</td>
<td>ENGL - English (ENGL) ......................................................................</td>
</tr>
<tr>
<td>504</td>
<td>English .............................................................................................</td>
</tr>
<tr>
<td>507</td>
<td>English - BA ....................................................................................</td>
</tr>
<tr>
<td>508</td>
<td>English - BA, Middle School Teaching ...............................................</td>
</tr>
<tr>
<td>510</td>
<td>English - Minor ................................................................................</td>
</tr>
<tr>
<td>797</td>
<td>ENGR - Engineering (ENGR) ...............................................................</td>
</tr>
<tr>
<td>170</td>
<td>Enology - Certificate .........................................................................</td>
</tr>
<tr>
<td>799</td>
<td>ENST-Environmental Studies (ENST) ...................................................</td>
</tr>
<tr>
<td>800</td>
<td>ENTC - Engineering Technology (ENTC) ..............................................</td>
</tr>
<tr>
<td>800</td>
<td>ENTO - Entomology (ENTO) ...............................................................</td>
</tr>
</tbody>
</table>
Texas A&M University Undergraduate Catalog

Entomology ................................................................. 160
Entomology - BS ...................................................... 161
Entomology - Minor ................................................... 166
Entrepreneurial Leadership - Certificate .................... 271
Environmental Design Architectural Studies - BED ...... 215
Environmental Geosciences - BS ................................ 424
Environmental Geosciences - BS / MOST, 2+1 Program ... 428
Environmental Geosciences - Minor ......................... 433
Environmental Soil Science - Minor .......................... 200
Environmental Studies - BS ....................................... 182
Environmental Studies - Minor ................................. 130
EPFB - Educ Psyc Field Based (EPFB) ......................... 429
EPSY - Educational Psychology (EPSY) ..................... 803
Equine Science - Certificate ...................................... 141
ESET - Electronic Sys Eng Tech (ESET) ....................... 803
ESSM Ecosystem Science & Mgmt (ESSM) ................. 806
EURO - European Studies (EURO) ............................ 809
European Union Business - Certificate ....................... 241
EVEN - Environmental Engr (EVEN) ......................... 811
Extension Education - Minor ..................................... 136
F
Facility Management - Minor .................................. 221
Faculty ................................................................. 995
Family Educational Rights and Privacy Act ................ 1118
FILM - Film Studies (FILM) ........................................ 811
Film Studies - Minor ................................................ 480
Finance ................................................................. 250
Finance - BBA ......................................................... 251
Financial Assistance and Scholarships ....................... 97
Financial Planning - Minor ....................................... 130
FINC - Finance (FINC) ............................................. 813
FIVS - Forensic & Inv Science (FIVS) ......................... 815
Food Science and Technology - BS, Food Industry Option 172
Food Science and Technology - BS, Food Science Option 174
Forensic and Investigative Sciences - BS, Pre-Law Emphasis 163
Forensic and Investigative Sciences - BS, Science Emphasis 165
Forestry - BS ......................................................... 152
Forestry - Minor ...................................................... 158
FREN - French (FREN) ............................................. 817
French - Minor ....................................................... 537
FRSC - Forest Science (FRSC) .................................... 818
FSTC - Food Science & Tech (FSTC) ......................... 818

G
GALV - TAMUG Study Abroad (GALV) ..................... 821
Game Design and Development - Minor ................... 234
Game Design and Development - Minor ................... 388
GENE - Genetics (GENE) ...................................... 821
General Information .................................................... 20
Genetics - BS .......................................................... 144
Genetics - Minor ...................................................... 146
GEOG - Geography (GEOG) .................................... 822
Geographic Information Science and Technology - B.S., Human Systems and Society Track .............. 443
Geographic Information Science and Technology - BS, Computation, Design and Analysis Track .......... 439
Geographic Information Science and Technology - BS, Earth Systems and Analysis Track .................. 441
Geography ............................................................. 438
Geography - BS ....................................................... 445
Geography - Minor .................................................. 450
Geoinformatics - Minor ........................................... 451
GEOL - Geology (GEOL) ......................................... 826
Geology - BA ............................................................ 451
Geology - BA / MOST, 3+2 Program ......................... 453
Geology - BS ............................................................ 454
Geology - BS / MOST, 3+2 Program ......................... 455
Geology - Minor ...................................................... 458
Geology and Geophysics ........................................... 451
GEOP - Geophysics (GEOP) ..................................... 829
Geophysics - BS ....................................................... 457
Geophysics - Minor .................................................. 458
GEOS - Geosciences (GEOS) .................................... 830
GERM - German (GERM) ......................................... 831
German - Minor ....................................................... 537
Global Art Design and Construction - Minor ............... 217
Global Culture and Society - Minor ......................... 212
Global Culture and Society - Minor ......................... 480
Grading System ....................................................... 76
H
HBRW - Hebrew (HBRW) ......................................... 833
Health - BS, Allied Health Track ............................... 311
Health - BS, School Health Track ................................ 312
Health and Kinesiology ............................................. 302
Health Communication - Certificate, Health Campaign/Policy Track ........................................ 494
Healthy Development - Certificate ............................ 553
HEFB - Health Ed Field Based (HEFB) ....................... 833
Landscape Architecture - 6-Year Bachelor of Landscape Architecture/Master of Land and Property Development ................................................................. 225
Landscape Architecture - 6-Year Bachelor of Landscape Architecture/Master of Urban Planning ................................................................. 226
Landscape Architecture - BLA .............................................................................. 224
Landscape Architecture and Urban Planning ................................................................. 222
Latin American Business - Certificate .............................................................................. 243
Latino/a and Mexican-American Studies - Minor ................................................................. 559
LBAR - College of Liberal Arts (LBAR) ...................................................................... 867
LDEV - Land Development (LDEV) .............................................................................. 868
Leadership - Minor ................................................................................................. 136
Leadership - Minor ................................................................................................. 481
Leadership in the Design and Construction Professions - Minor .............................. 221
Leadership Study and Development - Certificate ................................................................. 661
Liberal Arts Honors - Minor .................................................................................... 481
Liberal Studies ............................................................................................................. 664
LING - Linguistics (LING) ....................................................................................... 868
LMAS - Latino/Mex Amer Studies (LMAS) ...................................................................... 868

M
Management ..................................................................................................................... 259
Management - BBA, Consulting/General Management Track ........................................... 261
Management - BBA, Entrepreneurial Leadership Track ...................................................... 263
Management - BBA, Human Resource Management Track ................................................. 265
Management - BBA, Nonprofit Management Track ............................................................. 267
Management - BBA, Pre-Law Track .................................................................................. 269
Management Information Systems - BBA .......................................................................... 255
Manufacturing and Mechanical Engineering Technology - BS ........................................ 396
MARA - Maritime Administration (MARA) ..................................................................... 868
MARB - Marine Biology (MARB) ..................................................................................... 870
MARE - Marine Engr Technology (MARE) ..................................................................... 874
Marine Biology ............................................................................................................... 670
Marine Biology - BS ................................................................................................. 671
Marine Biology - BS, License Option ............................................................................ 672
Marine Biology - Minor ............................................................................................... 675
Marine Engineering Technology ...................................................................................... 675
Marine Engineering Technology - BS ................................................................................. 676
Marine Engineering Technology - BS, License Option ......................................................... 678
Marine Fisheries - BS ................................................................................................. 674
Marine Sciences ............................................................................................................. 679
Marine Sciences - BS ................................................................................................. 681
Marine Sciences - BS, License Option ............................................................................ 682
Marine Transportation - BS ......................................................................................... 692
Maritime Administration ............................................................................................... 688
Maritime Administration - BS ....................................................................................... 690
Maritime Administration - Minor ..................................................................................... 691
Maritime Administration - 5-year BS/MML ..................................................................... 689
Maritime Studies - BA ................................................................................................. 666
Maritime Studies - Minor ............................................................................................... 670
Maritime Transportation ............................................................................................... 692
Marketing ....................................................................................................................... 271
Marketing - BBA, Advertising Strategy Track .................................................................. 273
Marketing - BBA, Analytics and Consulting Track ........................................................... 275
Marketing - BBA, Professional Selling and Sales Management Track .............................. 277
Marketing - BBA, Retail Buying and Management Track ................................................. 279
MARR - Marine Engr Technology (MARR) ................................................................. 876
MARS - Marine Science (MARS) .................................................................................... 877
MART - Marine Transportation (MART) .......................................................................... 880
MASC - Integrated Math & Sci (MASC) .......................................................................... 882
MASE - Maritime Systems Engr (MASE) ......................................................................... 883
MAST - Maritime Studies (MAST) ................................................................................... 883
Materials Science and Engineering ................................................................................ 404
Materials Science and Engineering - Minor ....................................................................... 405
MATH - Mathematics (MATH) ...................................................................................... 885
Mathematics ................................................................................................................ 613
Mathematics - 5-Year BA/MS ......................................................................................... 629
Mathematics - 5-Year BS/MS ......................................................................................... 632
Mathematics - BA ........................................................................................................ 627
Mathematics - BS ......................................................................................................... 630
Mathematics - Minor ................................................................................................... 634
Mays Business School ................................................................................................. 235
Meat Science - Certificate ............................................................................................. 141
Mechanical Engineering ............................................................................................... 405
Mechanical Engineering - BS ....................................................................................... 408
MEEN - Mechanical Engineering (MEEN) .................................................................... 890
MEFB - Mid Grds Ed Field Based (MEFB) ..................................................................... 894
MEPS-Molecular & Env Plant Sci (MEPS) ....................................................................... 894
Meteorology - BS ........................................................................................................ 435
Meteorology - BS / MOST, 3+2 Program ....................................................................... 436
Meteorology - Minor .................................................................................................... 438
METR - Meteorology (METR) ....................................................................................... 895
MGMT - Management (MGMT) ..................................................................................... 895
MICR - Microbiology (MICR) ....................................................................................... 898
Microbiology - BS ...................................................................................................... 592
Military Science ............................................................................................................ 658
Military Studies - Minor ............................................................................................... 660
| **MKG** - Marketing (MKG) | 898 |
| **MLSC** - Military Science (MLSC) | 900 |
| **MMET** - Mfg & Mech Engr Tech (MMET) | 900 |
| **Modern Languages - BA, French** | 532 |
| **Modern Languages - BA, German** | 533 |
| **Modern Languages - BA, Russian** | 534 |
| **MODL** - Modern Languages (MODL) | 903 |
| **Molecular and Cell Biology - BS** | 593 |
| **MSEN** - Materials Science & Engr (MSEN) | 903 |
| **Multidisciplinary Engineering Technology - BS** | 398 |
| **MUSC** - Music (MUSC) | 906 |
| **Museum Studies - Minor** | 487 |
| **MXET** - Multidiscip Engr Tech (MXET) | 910 |
| **N** |  |
| **NAUT** - Nautical Science (NAUT) | 910 |
| **Naval Science** | 658 |
| **Neuroscience** | 110 |
| **Neuroscience - Certificate** | 111 |
| **Neuroscience - Minor** | 110 |
| **Nonprofit and Social Innovation - Certificate** | 244 |
| **NRSC** - Neuroscience (NRSC) | 910 |
| **Nuclear Engineering** | 412 |
| **Nuclear Engineering - BS** | 413 |
| **Nuclear Engineering - Minor** | 414 |
| **NUEN** - Nuclear Engineering (NUEN) | 912 |
| **NURS** - Nursing (NURS) | 914 |
| **Nursing - BS, RN to BSN Track** | 573 |
| **Nursing - BS, Second Degree BSN Track** | 574 |
| **Nursing - BS, Traditional BSN** | 574 |
| **NUTR** - Nutrition (NUTR) | 916 |
| **Nutrition - BS, Didactic Program in Dietetics Track** | 176 |
| **Nutrition - BS, General Nutrition Track** | 177 |
| **Nutrition - BS, Molecular and Experimental Track** | 179 |
| **Nutrition and Food Science** | 171 |
| **NVSC** - Naval Science (NVSC) | 918 |
| **O** |  |
| **Oak Ridge Associated Universities (ORAU)** | 1124 |
| **Occupational Health and Safety - Minor** | 580 |
| **Ocean and Coastal Resources - 5-year bachelor of science/master of marine resources management** | 685 |
| **Ocean and Coastal Resources - BS** | 684 |
| **Ocean and Coastal Resources - Minor** | 688 |
| **Ocean Engineering** | 415 |
| **Ocean Engineering - BS** | 416 |
| **Oceanography** | 458 |
| **Oceanography - BS** | 460 |
| **Oceanography - Minor** | 461 |
| **OCEN** - Ocean Engineering (OCEN) | 919 |
| **OCNG** - Oceanography (OCNG) | 923 |
| **OCRE Ocean & Coastal Resources (OCRE)** | 924 |
| **Orientation** | 79 |
| **P** |  |
| **Park and Natural Resource Management - Minor** | 192 |
| **Parks and Conservation - Certificate** | 194 |
| **PERF** - Performance Studies (PERF) | 924 |
| **Performance Studies** | 538 |
| **Performance Studies - BA** | 539 |
| **Performance Studies - Minor** | 540 |
| **Performance Technology - Minor** | 540 |
| **PETE** - Petroleum Engineering (PETE) | 926 |
| **Petroleum Engineering** | 417 |
| **Petroleum Engineering - BS** | 419 |
| **Petroleum Engineering - Minor** | 421 |
| **PHIL** - Philosophy (PHIL) | 928 |
| **Philosophy - BA** | 541 |
| **Philosophy - Minor** | 542 |
| **Philosophy and Humanities** | 541 |
| **Philosophy Pre-Law - Certificate** | 542 |
| **PHLT** - Public Health (PHLT) | 931 |
| **PHYS** - Physics (PHYS) | 933 |
| **Physics - BA** | 637 |
| **Physics - BS** | 638 |
| **Physics - Minor** | 639 |
| **Physics and Astronomy** | 634 |
| **Plant and Environmental Soil Science - BS, Crops Emphasis** | 197 |
| **Plant and Environmental Soil Science - BS, Soil and Water Emphasis** | 198 |
| **Plant Breeding - Minor** | 201 |
| **Plant Pathology and Microbiology** | 180 |
| **PLPA** - Plant Pathology (PLPA) | 936 |
| **Political Science** | 543 |
| **Political Science - 5-Year BA/MPSA** | 546 |
| **Political Science - 5-Year BS/MPSA** | 547 |
| **Political Science - BA** | 545 |
| **Political Science - BS** | 546 |
| **POLS** - Political Science (POLS) | 936 |
| **Polymer Specialty - Certificate** | 349 |
Sustainable Architecture and Planning - Minor ........................................... 217

T
TCMG - Technology Management (TCMG) .............................................. 972
Teaching, Learning and Culture ............................................................... 326
Technology Management - BS ............................................................... 294
Technology Management - Minor ......................................................... 295
TEED - Teacher Education (TEED) ......................................................... 973
TEFB - Teacher Ed Field Based (TEFB) ................................................... 973
Telecommunication Media Studies - BA .................................................. 490
Telecommunication Media Studies - BS ................................................... 492
Texas A&M Catalogs ............................................................................. 12
Texas A&M University Galveston Campus ............................................. 662
Texas A&M University Qatar Campus .................................................... 695
Texas Common Course Numbering System ......................................... 107
THAR - Theatre Arts (THAR) ................................................................. 974
Tourism Management - Certificate ....................................................... 195
Tourism Management - Minor ............................................................... 193
Trading, Risk and Investments - Certificate ............................................ 254
Transition Academic Programs ............................................................... 107
Tuition, Fees and Other Financial Information ....................................... 89
Turfgrass Science - BS ............................................................................ 199

U
UGST - Undergraduate Studies (UGST) ................................................. 977
Undergraduate Catalog ........................................................................ 14
University Academic Catalog ............................................................... 15
University Core Curriculum .................................................................. 21
University Policies .................................................................................. 101
University Studies - BA, Journalism Concentration .............................. 560
University Studies - BA, Race, Gender, Ethnicity Concentration .......... 561
University Studies - BA, Religious Thought, Practices and Cultures Concentration ......................................................... 563
University Studies - BA, Society, Ethics and Law Concentration .......... 564
University Studies - BS, Biomedical Sciences Concentration ............... 654
University Studies - BS, Business Concentration ................................ 283
University Studies - BS, Child Professional Services Concentration ..... 300
University Studies - BS, Child Professional Services Concentration ..... 300
University Studies - BS, Dance Concentration ..................................... 323
University Studies - BS, Dance Concentration ..................................... 323
University Studies - BS, Environmental Business Concentration ....... 183
University Studies - BS, Environmental Business Concentration ....... 183
University Studies - BS, Geographic Information Science and Technology Concentration .................................................. 448
University Studies - BS, Geographic Information Science and Technology Concentration .................................................. 448
University Studies - BS, Geography Concentration ............................. 448
University Studies - BS, Geography Concentration ............................. 448
University Studies - BS, Global Arts, Planning, Design and Construction Concentration .................................................. 230
University Studies - BS, Health Humanities Concentration ................. 565
University Studies - BS, Leadership Studies Concentration ................. 135
University Studies - BS, Leadership Studies Concentration ................. 135
UNIVERSITY STUDIES - BS, Liberal Arts Concentration ...................... 566
University Studies - BS, Marine Environmental Law and Policy Concentration .................................................. 667
University Studies - BS, Maritime Public Policy and Communication Concentration .................................................. 668
University Studies - BS, Mathematics for Business Concentration ..... 642
University Studies - BS, Mathematics for Pre-Professionals Concentration .................................................. 643
University Studies - BS, Mathematics for Teaching Concentration ...... 644
University Studies - BS, Oceans and One Health Concentration .......... 687
University Studies - BS, Race, Gender, Ethnicity Concentration .......... 567
University Studies - BS, Science for Secondary Teaching Concentration 643
University Studies - BS, Sports Conditioning Concentration ................ 324
University Studies - BS, Sports Conditioning Concentration ................ 324
University Studies - BS, Tourism and Coastal Community Development Concentration .................................................. 669
University Studies Degrees .................................................................... 108
University Studies Programs ................................................................. 201
University Studies Programs ................................................................. 201
University Studies Programs ................................................................. 230
University Studies Programs ................................................................. 283
University Studies Programs ................................................................. 334
University Studies Programs ................................................................. 461
University Studies Programs ................................................................. 560
University Studies Programs ................................................................. 642
University Studies Programs ................................................................. 654
University Studies Programs ................................................................. 654
Urban and Regional Planning - 5-Year Bachelor of Science/Master of Land and Property Development .................................................. 228
Urban and Regional Planning - 5-Year Bachelor of Science/Master of Urban Planning .................................................. 229
Urban and Regional Planning - BS ......................................................... 227
Urban and Regional Planning - Minor ................................................... 230
URPN - Urban & Reg Planning (URPN) .................................................. 978

V
Veterinary Integrative Biosciences .......................................................... 651
Veterinary Large Animal Clinical Sciences .......................................... 651
Veterinary Pathobiology ....................................................................... 651
Veterinary Physiology and Pharmacology ........................................... 653
VIBS - Vet Integrative Biosci (VIBS) ....................................................... 980