ENVIRONMENTAL SYSTEMS SCIENCE - BS

This program embraces the disciplines of environmental systems science to give students a rigorous interdisciplinary education including issues associated with environmental policy.

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 degree trains students for employment by industry, environmental and engineering consulting firms, non-governmental organizations, and governmental regulatory agencies, among other entities. Students focus on coursework in a particular environmental theme: coastal and marine environments, water, human impact on the environment, climate change, or biosphere.

Program Requirements

First Year		
Fall		**Semester Credit Hours**
CHEM 119	Fundamentals of Chemistry I	4
ENSS 105	Introduction to Environmental Systems Science	3
MATH 151 or MATH 147	Engineering Mathematics I or Calculus I for Biological Sciences	4
Select one of the following: [1,2,3]		4
ATMO 201 & ATMO 202	Weather and Climate and Weather and Climate Laboratory	
GEOG 203 & GEOG 213	Planet Earth and Planet Earth Lab	
GEOL 101 & GEOL 102 or GEOL 150	Principles of Geology or Introduction to the Solid Earth	
OCNG 251 & OCNG 252	The Blue Planet - Our Oceans and The Blue Planet - Our Oceans Laboratory	
	Semester Credit Hours	**15**
Spring		
CHEM 120	Fundamentals of Chemistry II	4
ENSS 205	Environmental Programs Cornerstone	1
MATH 152 or MATH 148	Engineering Mathematics II or Calculus II for Biological Sciences	4
Select one of the following: [1,2,3]		4
ATMO 201 & ATMO 202	Weather and Climate and Weather and Climate Laboratory	
GEOG 203 & GEOG 213	Planet Earth and Planet Earth Lab	
GEOL 101 & GEOL 102 or GEOL 150	Principles of Geology or Introduction to the Solid Earth	
OCNG 251 & OCNG 252	The Blue Planet - Our Oceans and The Blue Planet - Our Oceans Laboratory	
Social and behavioral sciences (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences) [4]		3
	Semester Credit Hours	**16**
Second Year		
Fall		
ATMO 210	Climate Change	3
ECCB 205 & ECCB 215	Fundamentals of Ecology and Fundamentals of Ecology--Laboratory	4
ENGL 104	Composition and Rhetoric	3
GEOL 208	Life on a Dynamic Planet	3
American history (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history)		3
	Semester Credit Hours	**16**
Spring		
GEOG 335	Pattern and Process in Biogeography	3
GEOG 390	Principles of Geographic Information Systems	4
Select one of the following:		4
PHYS 201	College Physics	
PHYS 206 & PHYS 226	Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences	
Language, philosophy and culture (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture)		3
	Semester Credit Hours	**14**
Third Year		
Fall		
POLS 206	American National Government	3
STAT 303 or STAT 211	Statistical Methods [5] or Principles of Statistics I	3
Select one of the following: [6]		3
ENSS 430	Global Science and Policy Making	
ENSS 431	Environmental Regulatory Compliance in Geoscience	
GEOG 330	Resources and the Environment	
PHIL 314	Environmental Ethics	
Communication (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication) [7]		3
General elective [8]		3
	Semester Credit Hours	**15**
Spring		
GEOG 410/ OCNG 412 or GEOL 443/ GEOG 443	Global Change or Global Biogeochemical Cycles	3
Select one of the following: [6]		3
ATMO 321	Computer Applications in the Atmospheric Sciences	
GEOL 360	Analyzing Data in Geology	
OCNG 456	MATLAB Programming for Ocean Sciences	

OCNG 469	Python for Geosciences	
Environmental theme electives [9]		6
General elective [8]		3
	Semester Credit Hours	**15**
Fourth Year		
Fall		
OCNG 470	Data Analysis Methods in Geosciences	4
American history (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history)		3
Environmental theme electives [9]		9
	Semester Credit Hours	**16**
Spring		
ENSS 405	Environmental Programs Capstone	3
POLS 207	State and Local Government	3
Creative arts (https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts)		3
Environmental theme elective [9]		4
	Semester Credit Hours	**13**
	Total Semester Credit Hours	**120**

1. Must take ATMO 201 & ATMO 202 if pursuing the Climate Change theme.
2. Must take GEOL 101 & GEOL 102 or GEOL 150 and GEOG 203 & GEOG 213 if pursuing the Hazards and Resilience theme and Water Systems Science theme.
3. Must take OCNG 251 & OCNG 252 and GEOG 203 & GEOG 213 if pursuing the Biosphere theme.
4. ESST 201 is recommended.
5. STAT 211 is required for the Environmental Modeling and Data Science theme.
6. Select electives in consultation with your academic advisor or faculty mentor.
7. ENGL 210 is recommended.
8. Select from any 100-499 course not used elsewhere.
9. Select 19 hours of theme courses in your junior and senior years in consultation with your academic advisor or faculty mentor from the list below.

Two courses in the degree plan must be writing intensive courses designated by the Environmental Programs in the schedule of classes. The graduation requirements include three hours of international and cultural diversity courses and three hours of cultural discourse 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.

Environmental Theme Electives

Code	Title	Semester Credit Hours
Biosphere		
Select from the following:		6-8
GEOG 435	Principles of Plant Geography	
OCNG 320	Biological Oceanography	
OCNG 355	The Blue Frontier - Harnessing Ocean Resources for Future Sustainability	
SCSC 301	Soil Science	
Select from the following:		3-8
BESC 403	Sampling and Environmental Monitoring	
GEOG 361	Remote Sensing in Geosciences	
GEOG 398	Interpretation of Aerial Photographs	
GEOG 450	Field Geography	
GEOG 461	Digital Image Processing in the Geosciences	
GEOG 475	Advanced Topics in GIS (Geographic Information Systems)	
OCNG 404	Ocean Observing Systems	
Select from the following:		3-8
PHIL 470	Animal Welfare, Ethics and Law	
ECCB 304	Conservation Biology	
ECCB 320	Ecosystem Restoration and Management	
ECCB 416	Fire Ecology and Natural Resource Management	
ECCB 417	Prescribed Fire	
ECCB 420	Ecological Restoration of Wetland and Riparian Systems	
GEOG 324	Global Climatic Regions	
OCNG 350	Marine Pollution	
OCNG 425	Microbial Oceanography	
RWFM 306	Wildlife and the Changing Environment	
RWFM 350	Wildlife and Fisheries Population Dynamics	
RWFM 404	Aquatic Ecosystems	
Total Semester Credit Hours		**19**

Code	Title	Semester Credit Hours
Climate Change		
ATMO 444	The Science and Politics of Global Climate Change	3
GEOG 467	Dynamic Modeling of Earth and Environmental Systems	4
GEOG 442/ GEOL 442	Past Climates	3
PHIL 317	Climate Ethics	3
Select from the following:		6
GEOG 309	Geography of Energy	
GEOG 324	Global Climatic Regions	
GEOG 409	Geographies of Decarbonization	
ATMO 363	Introduction to Atmospheric Chemistry and Air Pollution	
Total Semester Credit Hours		**19**

Code	Title	Semester Credit Hours
Environmental Modeling and Data Science		
GEOG 467	Dynamic Modeling of Earth and Environmental Systems	4
STAT 212	Principles of Statistics II	3
DAEN 210	Uncertainty Modeling	3
Select from the following		9
ATMO 321	Computer Applications in the Atmospheric Sciences	
DAEN 321	Quantitative Models for Statistical and Machine Learning	
DAEN 427/ ISEN 427	Decision and Risk Analysis	
GEOG 361	Remote Sensing in Geosciences	
GEOG 391	Geodatabases	
GEOG 461	Digital Image Processing in the Geosciences	
OCNG 404	Ocean Observing Systems	
OCNG 469	Python for Geosciences	
Total Semester Credit Hours		**19**

Code	Title	Semester Credit Hours
Hazards and Resilience		
GEOG 360	Natural Hazards	3
GEOG 331	Geomorphology	3
BESC 403	Sampling and Environmental Monitoring	3
Select from the following:		10
GEOG 303	Health Geography	
GEOG 361	Remote Sensing in Geosciences	
GEOG 430	Environmental Justice	
GEOG 434	Hydrology and Environment	
GEOL 301	Mineral Resources	
GEOL 351	Geochemistry	
GEOL 410	Hydrogeology	
GEOL 420	Environmental Geology	
OCNG 350	Marine Pollution	
Total Semester Credit Hours		**19**

Code	Title	Semester Credit Hours
Water Systems Science		
BESC 403	Sampling and Environmental Monitoring	3
GEOG 434	Hydrology and Environment	4
GEOL 351	Geochemistry	3
GEOL 410	Hydrogeology	3
GEOL 412	Environmental Hydrogeology	3
Select from the following:		3
AGSM 335	Water and Soil Management	
BESC 320	Water and the Bioenvironmental Sciences	
ECCB 420	Ecological Restoration of Wetland and Riparian Systems	
GEOG 324	Global Climatic Regions	
GEOG 331	Geomorphology	
RWFM 325	Watershed Analysis and Planning	
RWFM 404	Aquatic Ecosystems	
RWFM 440	Wetland Delineation	
SCSC 405	Soil and Water Microbiology	
SCSC 458	Watershed, Water and Soil Quality Management	
Total Semester Credit Hours		**19**