

ENVIRONMENTAL GEOSCIENCE - 5-YEAR BACHELOR OF SCIENCE AND MASTER OF WATER MANAGEMENT IN WATER MANAGEMENT AND HYDROLOGICAL SCIENCE

The combined program offers motivated and exceptional students the opportunity to achieve aspirations in an efficient program at Texas A&M, completing the Bachelor of Science (BS) degree in the Environmental Geosciences program and the Master of Science (MS) in the Water Management and Hydrological Science (WMHS) program in 5 years. The concurrent degree program will enable these motivated students to coordinate the required BS and MS coursework to complete the required credit hours for each degree within 5 years without diminishing scope or quality of work.

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. The Water Management and Hydrological Science (WMHS) program takes an interdisciplinary approach to provide students with strong technical skills in disciplines relevant to water resources. Students develop a broad understanding of hydrology and the interconnectedness of the biophysical and social sciences in water management to improve the reliability and quality of water resources for human well-being and development.

Program Requirements

First Year

		Semester Credit Hours
Fall		
CHEM 119	Fundamentals of Chemistry I	4
ENGL 104	Composition and Rhetoric	3
GEOS 105	Introduction to Environmental Geoscience	3
MATH 151	Engineering Mathematics I	4
Semester Credit Hours		14

Spring

CHEM 120	Fundamentals of Chemistry II	4
GEOS 205	Environmental Geosciences Cornerstone	1
MATH 152	Engineering Mathematics II	4
POLS 206	American National Government	3
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) ¹		3

Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture) ¹	3
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Semester Credit Hours 18

Second Year

Fall

BIOL 111	Introductory Biology I	4
GEOG 201	Introduction to Human Geography	3
Select one of the following: ²		4

ATMO 201 & ATMO 202	Weather and Climate and Weather and Climate Laboratory	
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GEOG 203 & GEOG 213	Planet Earth and Planet Earth Lab	
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GEOL 101 & GEOL 102 or GEOL 150	Principles of Geology or Introduction to the Solid Earth	
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OCNG 251 & OCNG 252	The Blue Planet - Our Oceans and The Blue Planet - Our Oceans Laboratory	
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American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) ¹	3
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Creative arts (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts) ¹	3
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Semester Credit Hours 17

Spring

BIOL 112	Introductory Biology II	4
GEOG 330	Resources and the Environment	3
POLS 207	State and Local Government	3
Select one of the following: ²		4

ATMO 201 & ATMO 202	Weather and Climate and Weather and Climate Laboratory	
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GEOG 203 & GEOG 213	Planet Earth and Planet Earth Lab	
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OCNG 251 & OCNG 252	The Blue Planet - Our Oceans and The Blue Planet - Our Oceans Laboratory	
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GEOL 101 & GEOL 102 or GEOL 150	Principles of Geology or Introduction to the Solid Earth	
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Communication (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication) ¹	3
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Semester Credit Hours 17

Third Year

Fall

STAT 303 or STAT 211	Statistical Methods ³ or Principles of Statistics I	3
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Select one of the following: ⁴		4
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PHYS 201	College Physics	
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PHYS 206 & PHYS 226	Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences	
Environmental policy elective ⁵		3
Environmental theme elective ⁶		3
Technical elective ⁷		3
Semester Credit Hours		16
Spring		
GEOG 390	Principles of Geographic Information Systems	4
GEOL 420	Environmental Geology	3
Environmental policy elective ⁵		3
Environmental theme elective ⁶		3
Technical elective ⁷		3
Semester Credit Hours		16
Fourth Year		
Fall		
OCNG 470	Data Analysis Methods in Geosciences	4
WMHS 601	Applications and Problems in Hydrological Sciences	3
WMHS 681	Seminar	1
Environmental theme elective ⁶		6
Water management common body of knowledge ⁸		3
Semester Credit Hours		17
Spring		
GEOS 405	Environmental Geosciences	3
Environmental theme elective ⁶		6
Technical elective ⁷		3
Water management common body of knowledge ⁸		3
Semester Credit Hours		15
Fifth Year		
Fall		
WMHS 681	Seminar	1
Graduate elective - water course ⁹		6
Water management common body of knowledge ⁸		3
Semester Credit Hours		10
Spring		
WMHS 602	Contemporary Issues in Water Resources	3
WMHS 685	Directed Studies	1
Graduate elective - water course ⁹		3
Water management common body of knowledge ⁸		3
Semester Credit Hours		10
Total Semester Credit Hours		150

¹ To be chosen from University approved Core Curriculum list. 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 if the course is approved as meeting the international and cultural diversity or cultural discourse requirement. See academic advisor.

- ² Choose one introductory course in the first semester and an additional in the second semester of sophomore year. Seek guidance from the academic advisor for Environmental Programs in Geosciences (ENVP).
- ³ STAT 211 is recommended for the Coastal and Marine Environment Theme.
- ⁴ PHYS 206 and PHYS 226 is recommended for the Coastal and Marine Environment Theme.
- ⁵ Environmental Policy electives should be chosen from the list below. Seek guidance about choices from the ENVP advisor.
- ⁶ Choose 18 hours of theme courses in your junior and senior years in consultation with your academic advisor from the list below. Internship courses can be taken for up to 6 credits and will normally be used as an adjustment to theme electives, but depending on the content of the internship credit, it can be applied as an adjustment to your technical electives or policy electives. Seek guidance from the ENVP academic advisor.
- ⁷ Technical electives should be chosen from the list below.
- ⁸ Water Management Common Body of Knowledge: Select from AGECE 604/PSAA 663 OR AGECE 606; CVEN 664; GEOG 626 OR GEOL 410; RWFM 665.
- ⁹ Consult graduate advisor for a list of graduate courses that meet water elective requirements.

Two courses in the bachelor of science degree plan must be writing intensive courses designated by the Environmental Programs in the schedule of classes. Also, international and cultural diversity electives (3 hours) and cultural discourse electives (3 hours) must be incorporated into the degree.

The program includes a total of 150 hours, which up to 0 hours may be applied toward both the Bachelor of Science in Environmental Geoscience and the Master of Water Management in Water Management and Hydrological Science.

Code	Title	Semester Credit Hours
Environmental Policy Electives		
AGEC 350	Environmental and Natural Resource Economics	3
AGEC 420	Food Security, Climate and Conflict	3
AGEC 422	Land Economics	3
ANTH 461	Environmental Archaeology	3
ARCH 213	Sustainable Architecture	3
ARCH 421	Energy and Sustainable Architecture	3
ATMO 444	The Science and Politics of Global Climate Change	3
BESC 311	International Perspectives on Environmental Issues	3
BESC 367	U.S. Environmental Regulations	3
BESC 411	Environmental Health and Safety Compliance	3
ECCB 460/RPTS 460	Nature, Values, and Protected Areas	3
ECON 202	Principles of Economics	3
ECON 203	Principles of Economics	3
ECON 323	Microeconomic Theory	3
GEOG 304	Economic Geography	3
GEOG 306	Introduction to Urban Geography	3

GEOG 309	Geography of Energy	3
GEOG 401	Political Geography	3
GEOG 406	Geographic Perspectives on Contemporary Urban Issues	3
GEOG 430	Environmental Justice	3
GEOS 430	Global Science and Policy Making	3
PHIL 314	Environmental Ethics	3
PHLT 330	The Environment and Public Health	3
POLS 347	Politics of Energy and the Environment	3
PSAA 440	Public Policies and Policymaking	3
RELS 420	Religion and the Environment	3
RWFM 375	Conservation of Natural Resources	3
RWFM 470	Environmental Impact Assessment	3
SOCI 328	Environmental Sociology	3
SOCI 450/ MGMT 478	Social Entrepreneurship	3
URPN 202	Building Better Cities	3
URPN 203	Smart Cities - Bit, Bots and Beyond	3
URPN 360	Issues in Environmental Quality	3
URPN 361	Urban Issues	3
URPN 371	Environmental Health Planning and Policy	3
URPN 460	Sustainable Communities	3
URPN 467	Land and Property Aspects of Sustainable Development	3

Code Title Semester Credit Hours

Environmental Theme Electives

Climate Change

ATMO 210	Climate Change	3
ATMO 444	The Science and Politics of Global Climate Change	3
PHYS 202	College Physics	4

Select the remaining courses from the following:

AGSM 477	Air Pollution Control and Regulatory Compliance	3
ATMO 363	Introduction to Atmospheric Chemistry and Air Pollution	3
ATMO 463	Air Quality	3
GEOG 324	Global Climatic Regions	3
GEOG 360	Natural Hazards	3
GEOG 410/ OCNG 412	Global Change	3
GEOG 442/ GEOL 442	Past Climates	3
GEOL 306	Sedimentology and Stratigraphy	4
GEOL 442/ GEOG 442	Past Climates	3
GEOL 443/ GEOG 443	Global Biogeochemical Cycles	3
GEOL 451	Introduction to Geochemistry	3
OCNG 310	Physical Oceanography	3
OCNG 340	Chemical Oceanography	3

OCNG 413	Polar Regions of the Earth: Science, Society and Discovery	3
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Coastal and Marine Environments

GEOG 370/ MARS 370	Coastal Processes or OCNG 41 or Global Oceanography	3
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Select the remaining courses from the following:

BIOL 440	Marine Biology	4
GEOG 331	Geomorphology	3
GEOG 360	Natural Hazards	3
GEOL 306	Sedimentology and Stratigraphy	4
GEOL 440	Engineering Geology	3
RWFM 404	Aquatic Ecosystems	3
OCNG 310	Physical Oceanography	3
OCNG 320	Biological Oceanography	3
OCNG 330	Geological Oceanography	3
OCNG 340	Chemical Oceanography	3
OCNG 350	Marine Pollution	3
OCNG 404	Ocean Observing Systems	3
OCNG 413	Polar Regions of the Earth: Science, Society and Discovery	3
OCNG 425	Microbial Oceanography	3
OCNG 443	Oceanographic Field and Laboratory Methods	3
OCNG 453	Hydrothermal Vents and Mid-Ocean Ridges	3
WFSC 425	Marine Fisheries	3

Human Impact on the Environment

GEOG 410/ OCNG 412	Global Change	3
GEOG 430	Environmental Justice	3

Select the remaining courses from the following:

AGSM 477	Air Pollution Control and Regulatory Compliance	3
ARCH 421	Energy and Sustainable Architecture	3
ATMO 326	Environmental Atmospheric Science	3
ATMO 363	Introduction to Atmospheric Chemistry and Air Pollution	3
ATMO 444	The Science and Politics of Global Climate Change	3
BESC 367	U.S. Environmental Regulations	3
ECCB 318	Coupled Social and Ecological Systems	3
ECCB 320	Ecosystem Restoration and Management	3
GEOG 309	Geography of Energy	3
GEOG 360	Natural Hazards	3
GEOG 401	Political Geography	3
GEOL 301	Mineral Resources	3
GEOL 404	Geology of Petroleum	3
GEOL 410	Hydrogeology	3
GEOL 440	Engineering Geology	3
GEOL 451	Introduction to Geochemistry	3

GEOS 431	Environmental Regulatory Compliance in Geoscience	3	Select the remaining courses from the following:		
OCNG 350	Marine Pollution	3	BIOL 214	Genes, Ecology and Evolution	3
OCNG 413	Polar Regions of the Earth: Science, Society and Discovery	3	BIOL 357	Ecology	3
RWFM 420	Ecology and Society	3	BESC 401	Bioenvironmental Microbiology	3
SENG 321	Safety Management Systems	3	BESC 402	Microbial Processes in Bioremediation	3
URPN 361	Urban Issues	3	ECCB 307	Forest Protection	3
Water			ECCB 309	Forest Ecology	3
GEOG 434	Hydrology and Environment	4	ECCB 320	Ecosystem Restoration and Management	3
GEOL 410	Hydrogeology	3	ECCB 403	Population and Community Ecology	3
Select the remaining courses from the following:			ECCB 416	Fire Ecology and Natural Resource Management	3
AGSM 335	Water and Soil Management	3	ECCB 420	Ecological Restoration of Wetland and Riparian Systems	3
AGSM 337	Technology for Environmental and Natural Resource Engineering	3	ECCB 430	Advanced Restoration Ecology	3
ATMO 251	Weather Observation and Analysis	3	GENE 302 & GENE 312	Principles of Genetics and Comprehensive Genetics Laboratory	4
ATMO 335	Atmospheric Thermodynamics	3	GENE 412	Population, Quantitative and Ecological Genetics	3
ATMO 352	Severe Weather and Mesoscale Forecasting	3	GEOG 435	Principles of Plant Geography	3
ATMO 443	Radar Meteorology	3	GEOG 442/GEOL 442	Past Climates	3
BESC 320	Water and the Bioenvironmental Sciences	3	GEOL 314	Paleontology and Geobiology	4
ECCB 420	Ecological Restoration of Wetland and Riparian Systems	3	GEOL 443/GEOG 443	Global Biogeochemical Cycles	3
GEOG 324	Global Climatic Regions	3	OCNG 425	Microbial Oceanography	3
GEOG 331	Geomorphology	3	OCNG 453	Hydrothermal Vents and Mid-Ocean Ridges	3
GEOG 360	Natural Hazards	3	RWFM 404	Aquatic Ecosystems	3
GEOG 400	Arid Lands Geomorphology	3	RWFM 419	Wildlife Restoration	3
GEOL 412	Environmental Hydrogeology	3	SCSC 301	Soil Science	4
GEOL 440	Engineering Geology	3	SCSC 405	Soil and Water Microbiology	3
GEOL 451	Introduction to Geochemistry	3	Code	Title	Semester Credit Hours
GEOL 443/GEOG 443	Global Biogeochemical Cycles	3	Technical Electives		
OCNG 340	Chemical Oceanography	3	AGSM 337	Technology for Environmental and Natural Resource Engineering	3
OCNG 350	Marine Pollution	3	AGSM 360	Occupational Safety Management	3
OCNG 413	Polar Regions of the Earth: Science, Society and Discovery	3	ATMO 321	Computer Applications in the Atmospheric Sciences	3
OCNG 425	Microbial Oceanography	3	ATMO 464	Laboratory Methods in Atmospheric Sciences	3
RWFM 301	Wildland Watershed Management	3	BESC 403	Sampling and Environmental Monitoring	3
RWFM 325	Watershed Analysis and Planning	3	CHEM 227	Organic Chemistry I	3
RWFM 404	Aquatic Ecosystems	3	CHEM 228	Organic Chemistry II	3
RWFM 440	Wetland Delineation	3	CHEM 237	Organic Chemistry Laboratory	1
SCSC 301	Soil Science	4	CHEM 238	Organic Chemistry Laboratory	1
SCSC 309	Water in Soils and Plants	3	CHEM 383	Chemistry of Environmental Pollution	3
SCSC 310	Soil Morphology and Interpretations	3	CHEM 483	Green Chemistry	3
SCSC 405	Soil and Water Microbiology	3			
SCSC 455	Environmental Soil and Water Science	3			
SCSC 458	Watershed, Water and Soil Quality Management	3			
Biosphere					
GEOG 335	Pattern and Process in Biogeography	3			
OCNG 320	Biological Oceanography	3			

ECCB 308	Fundamentals of Environmental Decision-Making	3
ECCB 406/ GEOG 462	Advanced GIS Analysis for Natural Resources Management	3
ECCB 444	Remote Sensing of the Environment	3
GEOG 312	Data Analysis in Geography	3
GEOG 352/ GEOL 352	GNSS in the Geosciences	3
GEOG 361	Remote Sensing in Geosciences	4
GEOG 380	Workshop in Environmental Studies	2-6
GEOG 391	Geodatabases	4
GEOG 392	GIS Programming	4
GEOG 398	Interpretation of Aerial Photographs	3
GEOG 450	Field Geography	3
GEOG 461	Digital Image Processing in the Geosciences	4
GEOG 462/ ECCB 406	Advanced GIS Analysis for Natural Resources Management	3
GEOG 467	Dynamic Modeling of Earth and Environmental Systems	4
GEOG 475	Advanced Topics in GIS (Geographic Information Systems)	4
GEOG 477	Terrain Analysis and Mapping	4
GEOG 478	WebGIS	4
GEOL 306	Sedimentology and Stratigraphy	4
GEOL 330	Geologic Field Trips	1-3
MATH 251	Engineering Mathematics III	3
MATH 253	Engineering Mathematics III	4
MATH 308	Differential Equations	3
OCNG 451	Mathematical Modeling of Ocean Climate	4
OCNG 456	MATLAB Programming for Ocean Sciences	3
OCNG 469	Python for Geosciences	3
PHLT 335	Hazardous Materials	3
PHYS 202	College Physics	4
PHYS 207 & PHYS 227	Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences	4
STAT 212	Principles of Statistics II	3
STAT 335/ CSCE 320	Principles of Data Science	3
STAT 407	Principles of Sample Surveys	3