

MAJOR IN ENVIRONMENTAL SCIENCE AND STUDIES - ENVIRONMENTAL SCIENCE CONCENTRATION

The Environmental Science Concentration prepares students to become environmental problem-solvers in a world confronting climate change, population expansion, pollution and depletion of natural resources. Students in this concentration select from several tracks depending on student interest in Biology, Chemistry, Geology or the more general, Environmental Science.

Requirements Environmental Science Concentration

The Environmental Science Concentration requires 43–45 units. Students then choose a track that provides advanced study in one of three different fields: biology, chemistry or geology, or for students who choose not to specialize, a more general Environmental Science Track is also available. Each track has its own required courses and electives. The Environmental Science Concentration requires a total of 71–86 units (depending upon the track selected).

Common Required Courses

Code	Title	Units
Natural Sciences		
BIOL 206 & 206L	BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LECTURE] and BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LAB]	4
CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
GEOL 121	PHYSICAL GEOLOGY	4
Mathematics and Statistics		
MATH 119 or MATH 211	PRE-CALCULUS ¹ or CALCULUS FOR APPLICATIONS	3-4
Select one of the following:		3-4
MATH 231	BASIC STATISTICS	
MATH 237	ELEMENTARY BIostatISTICS	
GEOG 375	QUANTITATIVE METHODS IN GEOGRAPHY	
ECON 205	STATISTICS FOR BUSINESS AND ECONOMICS I	
Social Sciences/Humanities		
ENGL 318 or GEOG 383	TECHNICAL AND SCIENTIFIC WRITING or NATURAL RESOURCES AND SOCIETY: A GEOGRAPHIC PERSPECTIVE	3
PHIL 255 or HLTH 451	ENVIRONMENTAL ETHICS or INTRODUCTION TO ENVIRONMENTAL HEALTH	3
Select two of the following sequences, which include both an upper-level and a lower-level course:		12

Sequence 1		
GEOG 101 & GEOG 410	PHYSICAL GEOGRAPHY and ENVIRONMENTAL GEOGRAPHY	
Sequence 2		
ECON 201	MICROECONOMIC PRINCIPLES	
ECON 375 or ECON 376	ENVIRONMENTAL ECONOMICS or NATURAL RESOURCE ECONOMICS	
Sequence 3		
POSC 103 or POSC 207	AMERICAN NATIONAL GOVERNMENT or STATE GOVERNMENT	
Select one of the following:		
ENVS 411	WATER POLICIES OF THE UNITED STATES	
ENVS 420	ENVIRONMENTAL POLICY AND SUSTAINABLE MANAGEMENT	
ENVS 425	SCIENCE AND POLICY OF THE CHESAPEAKE BAY RESTORATION	
Applications		
Select one of the following:		3
ENVS 482	ENVIRONMENTAL RESEARCH	
ENVS 485	ENVIRONMENTAL INTERNSHIP	
ENVS 491	SENIOR SEMINAR	
Total Units		43-45

Environmental Biology Track

Code	Title	Units
Required Courses		
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
BIOL 205 or BIOL 207	GENERAL BOTANY or GENERAL ZOOLOGY	4
Select one of the following:		4
BIOL 310	CONSERVATION BIOLOGY	
BIOL 402	GENERAL ECOLOGY	
BIOL 435	PLANT ECOLOGY	
Select one of the following:		
CHEM 330 or CHEM 331 & CHEM 332	ESSENTIALS OF ORGANIC CHEMISTRY or ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY II	5-10
Electives		
Select three of the following:		9-12
BIOL 304	NATURAL HISTORY INTERPRETATION AND PUBLIC ENVIRONMENTAL EDUCATION	
BIOL 306	HUMAN ECOLOGY AND SUSTAINABILITY	
BIOL 309	GENETICS	
BIOL 310	CONSERVATION BIOLOGY (if not taken as required)	
BIOL 318	MICROBIOLOGY	
BIOL 325	ANIMAL PHYSIOLOGY	
BIOL 334	HUMANS, SCIENCE AND THE CHESAPEAKE BAY	
BIOL 347	MARINE BIOLOGY	
BIOL 353	INVERTEBRATE ZOOLOGY	

BIOL 382	ENVIRONMENTAL EDUCATION AND SERVICE LEARNING IN THE TROPICS
BIOL 389	CURRENT DEVELOPMENTS IN BIOLOGY ²
BIOL 402	GENERAL ECOLOGY (if not taken as required)
BIOL 405	MOLECULAR ECOLOGY, EVOLUTION AND CONSERVATION
BIOL 406	LIMNOLOGY
BIOL 413	EVOLUTION
BIOL 419	ENVIRONMENTAL MICROBIOLOGY
BIOL 432	VASCULAR PLANT TAXONOMY
BIOL 435	PLANT ECOLOGY (if not taken as required)
BIOL 436	PLANT PHYSIOLOGY
or BIOL 447	TROPICAL FIELD ECOLOGY
BIOL 444	WILDLIFE MANAGEMENT
BIOL 446	TROPICAL ECOLOGY AND CONSERVATION
BIOL 447	TROPICAL FIELD ECOLOGY
BIOL 450	ECOLOGICAL BIOCHEMISTRY
BIOL 452	WETLAND ECOLOGY
BIOL 455	FISH BIOLOGY
BIOL 456	ORNITHOLOGY
BIOL 458	MAMMALOLOGY
BIOL 461	ENTOMOLOGY
BIOL 467	HERPETOLOGY
BIOL 473	ECOLOGICAL FIELD METHODS LABORATORY
BIOL 474	MOLECULAR TECHNIQUES IN ECOLOGY, EVOLUTION, AND CONSERVATION
CHEM 480	CHEMICAL TOXICOLOGY
Select one additional course from among any of the Environmental Science and Studies tracks.	
Total Units	28-38

Environmental Chemistry Track

Code	Title	Units
Required Courses		
CHEM 220 & 220L	ANALYTICAL CHEMISTRY [LECTURE] and ANALYTICAL CHEMISTRY [LAB]	5
CHEM 330	ESSENTIALS OF ORGANIC CHEMISTRY	5-10
or CHEM 331 & CHEM 332	ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY II	
PHYS 211 & PHYS 212	GENERAL PHYSICS I; NON CALCULUS-BASED and GENERAL PHYSICS II; NON CALCULUS-BASED ³	8
Select one of the following:		
BIOL 402	GENERAL ECOLOGY	4
or BIOL 406	LIMNOLOGY	
Select one of the following:		
GEOL 415	HYDROGEOLOGY	4
or GEOL 305	ENVIRONMENTAL GEOLOGY	
Electives		
Select six units from the following:		
CHEM 310	INSTRUMENTAL ANALYSIS	6

CHEM 323	INORGANIC CHEMISTRY
CHEM 345	PRINCIPLES OF PHYSICAL CHEMISTRY
CHEM 351	BIOCHEMISTRY
CHEM 356	BIOCHEMISTRY LAB
CHEM 372	PHYSICAL CHEMISTRY LABORATORY
CHEM 461	ADVANCED LECTURE TOPICS
CHEM 462	ADVANCED LABORATORY TECHNIQUES
CHEM 480	CHEMICAL TOXICOLOGY
Select one additional course from among any of the Environmental Science and Studies tracks	
Total Units	35-41

Environmental Geology Track

Code	Title	Units
Required Courses		
CHEM 220 & 220L	ANALYTICAL CHEMISTRY [LECTURE] and ANALYTICAL CHEMISTRY [LAB]	4-5
or GEOL 410	METHODS FOR ENVIRONMENTAL GEOCHEMISTRY	
PHYS 211	GENERAL PHYSICS I; NON CALCULUS-BASED ⁵	4
GEOL 305	ENVIRONMENTAL GEOLOGY	4
GEOL 331	MINERALOGY	4
GEOL 415	HYDROGEOLOGY	4
Select one of the following:		
GEOL 321	STRUCTURAL GEOLOGY	4
GEOL 443	SEDIMENTOLOGY AND STRATIGRAPHY	4
Electives		
Select one of the following:		
GEOL 301	SUSTAINABILITY AND THE USE OF NATURAL RESOURCES	3-4
GEOL 321	STRUCTURAL GEOLOGY (if not taken as required)	4
GEOL 333	PETROLOGY OF IGNEOUS AND METAMORPHIC ROCKS	4
GEOL 357	OCEANOGRAPHY	4
GEOL 443	SEDIMENTOLOGY AND STRATIGRAPHY (if not taken as required)	4
Select one additional course from among any of the Environmental Science and Studies tracks.		
Total Units	29-33	

Environmental Science Track

Code	Title	Units
Required Courses		
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
CHEM 220 & 220L	ANALYTICAL CHEMISTRY [LECTURE] and ANALYTICAL CHEMISTRY [LAB]	5
or CHEM 330	ESSENTIALS OF ORGANIC CHEMISTRY	

PHYS 211 & PHYS 212	GENERAL PHYSICS I; NON CALCULUS-BASED and GENERAL PHYSICS II; NON CALCULUS-BASED ³	8
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Electives

Select one of the following: (additional prerequisites may be required) 4

BIOL 402	GENERAL ECOLOGY	
BIOL 310	CONSERVATION BIOLOGY	
BIOL 406	LIMNOLOGY	
GEOL 415	HYDROGEOLOGY	
GEOL 305	ENVIRONMENTAL GEOLOGY	

Two additional environmental electives in the same discipline from biology, chemistry, geology or geography AND one additional course selected from among any of the Environmental Science and Studies tracks 9-12

Total Units 30-33

¹ The requirement of MATH 119 or MATH 211 may also be satisfied by successful completion of MATH 273 or MATH 274.

² Acceptable topics related to environmental science and studies. Please contact the Environmental Science and Studies program director for approval.

³ The requirement of PHYS 211 and PHYS 212 may also be satisfied by successful completion of PHYS 241 and PHYS 242.

⁴ GEOL 410 preferred.

⁵ The requirement of PHYS 211 may also be satisfied by successful completion of PHYS 241.

Four-Year Plan of Study

Suggested Four-Year Plan

Based on course availability and student needs and preferences, the selected sequences will probably vary from those presented below. Students should consult with their adviser to make the most appropriate elective choices.

Freshman

Term 1	Units	Term 2	Units
CHEM 131 & 131L (Core 8)	4	BIOL 206 & 206L (Core 7)	4
MATH 119 or 211 (Core 3)	4	CHEM 132 & 132L	4
Select one of the following: ¹	4	ECON/GEOG/POSC lower level (Core 6)	3
BIOL 200 & 200L	3	Core 2 (or Core 1)	3
GEOL 121			
Core 1 (or Core 2)	3		
	15		14

Sophomore

Term 1	Units	Term 2	Units
ECON 205, GEOG 375, MATH 231, or MATH 237	3	ECON/GEOG/POSC upper level	3
ECON/GEOG/POSC lower level	4	3 Track Requirement	4

GEOL 121 (or Track Requirement)	4	Track Requirement	4
Core 4	3	Core 10	3
Core 5	3		
	16		14

Junior

Term 1	Units	Term 2	Units
ECON/GEOG/POSC upper level	3	ENGL 318 (Core 9)	3
HLTH 451 or PHIL 255	3	Track Requirement	4
Track Requirement	4	Track Requirement	5
Core 11	3	Core 13	3
Core 12	3		
	16		15

Senior

Term 1	Units	Term 2	Units
ENVS 482, 485, or 491	3	Track Requirement or elective	3
Track Requirement	3	Track Requirement or elective	3
Track Requirement	4	Elective	3
Core 14	3	Elective	3
Elective	3	Elective	2
	16		14

Total Units 120

¹ BIOL 200 / BIOL 200L is required for Environmental Biology and Environmental science track and is a prerequisite for BIOL 206. However, students in other environmental science tracks that elect not to take BIOL 200/200L could consider GEOL 121 in this semester.

Learning Outcomes

- Apply their knowledge of the sciences and the scientific method to collect, analyze and interpret data that they have collected or to critique the methods used by others to collect, analyze and interpret data.
- Identify the cultural, economic, geographic and/or political facets of environmental problems/situations and relate their understanding of these components to particular situations.
- Relate the theoretical background materials presented in natural science, social science or humanities courses to specific current environmental problems/dilemmas.
- Students will display competency in essential skills required of a college graduate by reading, interpreting, analyzing and evaluating written discourse.
- Students will display competency in essential skills required of a college graduate by researching a topic, develop an argument and organize supporting details (ILTC).