

# Undergraduate Studies Catalog 2009-2011

## Environmental Science and Biology

**105 Lennon Hall**

**(585) 395-5975**

**E-mail: [jhaynes@brockport.edu](mailto:jhaynes@brockport.edu)**

*Chairperson and Professor:* James M. Haynes, PhD, University of Minnesota;  
*Distinguished Service Professor:* Joseph C. Makarewicz, PhD, Cornell University;  
*Empire Innovation Professor of Wetland Science:* Douglas A. Wilcox, PhD, Purdue University; *Professor:* Christopher J. Norment, PhD, University of Kansas; *Assistant Professors:* Mark D. Norris, PhD, University of Minnesota; Jacques Rinchar, PhD, University of Namur (Belgium); *Instructional Support Technician:* Hilary R. Mosher;  
*Environmental Science Program Faculty:* Whitney J. Autin, Associate Professor of Earth Sciences, PhD, Louisiana State University; Mark R. Noll, Associate Professor of Earth Sciences, PhD, University of Delaware; Paul L. Richards, Assistant Professor of Earth Sciences, PhD, Pennsylvania State University; James A. Zollweg, Associate Professor of Earth Sciences, PhD, Cornell University; Michael A. Brown, Assistant Professor of Chemistry, PhD, University of Memphis; Mark P. Heitz, Associate Professor of Chemistry, PhD, SUNY at Buffalo; Markus M. Hoffmann, Associate Professor of Chemistry, PhD, Washington University; *Adjunct Faculty:* David H. Kosowski (NYDEC retired); Theodore W. Lewis (Research Associate); Charles R. O'Neill (New York Sea Grant); Gary N. Neuderfer (NYDEC retired); and Norma A. Polizzi (JD). York Sea Grant); Gary N. Neuderfer (NYDEC retired); and Norma A. Polizzi (Adair Law Firm).

- [Requirements](#)
- [Aquatic Ecology/Biology](#) Concentration
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- Combined Aquatic and Terrestrial Ecology/Biology Concentration
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Environmental problems are among the most urgent issues facing our civilization. In order to manage Earth's environment well, we must understand the processes that shape its surface; control the chemistry of the air, water and soil; and produce and maintain the biological and other resources upon which humans depend. We must also understand the interactions of animals, plants and other living organisms with their physical and chemical environments, or their ecology. Through a curriculum with a common core and a focused concentration, environmental science majors develop conceptual knowledge and technical skills to use the disciplines of biology, ecology, chemistry and the earth sciences to understand and solve environmental problems. Five concentrations are offered in the environmental science major: aquatic ecology/biology, terrestrial

ecology/biology, combined aquatic and terrestrial ecology/biology, environmental chemistry, and earth sciences. After declaring a major in environmental science with the department secretary in 105 Lennon Hall, (585) 395-5975, a faculty advisor in the selected concentration will be assigned.

Minors in environmental science and in environmental studies are offered for non-majors. Contact the department secretary in 105 Lennon Hall, (585)395-5975, for information and for an appointment with the department Chair to set up an individual course of study.

Students majoring in environmental science can achieve New York State Teacher Certification to teach biology, chemistry or earth science. After making the decision to pursue certification, see your advisor in the Department of Environmental Science and Biology immediately.

## Major Requirements

The major requires a minimum of 62-73 credits balanced between required courses in the core curriculum (38 credits) and required, elective, or co-requisite courses in the area of concentration (24-36 credits).

Core courses (required of all majors)

Fall Semester Courses		Credits
ENV 202	Environmental Science	4
ENV 452	Environmental Laws and Regulations	3
CHM 205	College Chemistry I	4
GEL 201	Physical Geology	4
MTH 201	Calculus I	4
Spring Semester Courses		Credits
ENV 202	Environmental Science	4
ENV 204	Biology of Organisms	4
ENV 303	Ecology	4
ENV 492	Global Environmental Issues	3
CHM 206	College Chemistry II	4
CHM 303	Analytical Chemistry	4
MTH 201	Calculus I	4

Concentrations (Required or elective courses)	Credits	Corequisite
Aquatic Ecology/Biology	20	4

Terrestrial Ecology/Biology	20	4
Combined Aquatic and Terrestrial Ecology/Biology	31	4
Wetland Ecology		
Environmental Chemical Analysis	21	14
Earth Science	20	4
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Total Concentration Credits:	20-31	4-14

## Concentration in Aquatic Ecology/Biology

	Credits
<i>Required:</i>	
ENV 419 Limnology ( <i>Fall</i> )	3
ENV 421 Limnology Laboratory ( <i>Fall</i> )	2
<i>One of*:</i>	
ENV 423 Pollution Biology ( <i>Odd spring</i> )	3
ENV 436 Water Quality Analysis ( <i>Spring</i> )	4
ENV 462 Aquatic Toxicology ( <i>Even spring</i> )	4
<i>One of*:</i>	
ENV 483 Aquatic Invertebrates ( <i>Odd spring</i> )	4
ENV 484 Fish Ecology ( <i>Even spring</i> )	3
ENV 490 Fishery Techniques and Fish Identification ( <i>Odd fall</i> )	2
<i>Electives: 7-10 credits chosen by advisement from:</i>	
ENV 319 Biological Oceanography ( <i>Offered irregularly</i> )	3
ENV 427 Animal Behavior ( <i>Even fall</i> )	3
ENV 435 Restoration Ecology ( <i>Odd spring</i> )	3
ENV 437 Biostatistics ( <i>Fall</i> )	3
ENV 439 Conservation Biology ( <i>Even fall</i> )	3
ENV 446 Wetland Ecology ( <i>Odd fall</i> )	4
ENV 457 Marine Biology-Bahamas ( <i>Fall</i> )	3
ENV 464 Aquaculture I ( <i>Odd fall</i> )	4
ENV 474 Aquaculture II ( <i>Even fall</i> )	4
ENV 476 Animal Ecophysiology ( <i>Odd fall</i> )	3
ENV 488 Environmental Impact Analysis ( <i>Even summer</i> )	4-6
ENV 498 Collaborative Research ( <i>Each semester</i> )	1-3

ESC 412	Hydrology ( <i>Odd fall</i> )	4
ESC 418	Watershed Sciences ( <i>Odd spring</i> )	3
GEL 462	Groundwater ( <i>Odd spring</i> )	4

*Co-requisite course:*

CHM 305	Organic Chemistry I ( <i>Fall</i> )	4
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\*Can take additional courses from these groups as electives.

## Concentration in Terrestrial Ecology

*One of\*:* Credits

ENV 400	Plant Diversity ( <i>Odd fall</i> )	4
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ENV 405	Plant Ecology ( <i>Even fall</i> )	4
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*One of\*:*

ENV 430	Ornithology ( <i>Even spring</i> )	4
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ENV 440	Herpetology ( <i>Odd spring</i> )	4
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ENV 459	Mammalogy ( <i>Odd fall</i> )	4
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*Electives: 12 credits chosen by advisement from:*

ENV 406	Wildlife Ecology ( <i>Even fall</i> )	4
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ENV 423	Pollution Biology ( <i>Odd spring</i> )	3
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ENV 427	Animal Behavior ( <i>Even fall</i> )	3
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ENV 435	Restoration Ecology ( <i>Odd spring</i> )	3
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ENV 437	Biostatistics ( <i>Fall</i> )	3
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ENV 439	Conservation Biology ( <i>Even fall</i> )	3
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ENV 444	Terrestrial Ecosystem Ecology ( <i>Even spring</i> )	3
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ENV 446	Wetland Ecology ( <i>Odd fall</i> )	4
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ENV 476	Animal Ecophysiology ( <i>Odd fall</i> )	3
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ENV 477	Field Biology ( <i>Odd summer</i> )	4
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ENV 488	Environmental Impact Analysis ( <i>Even summer</i> )	4-6
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ENV 498	Collaborative Research ( <i>Each semester</i> )	1-3
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ESC 313	Environmental Climatology ( <i>Spring</i> )	3
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ESC 431	Environmental Applications of Geographic Information Systems ( <i>Spring</i> )	3
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ESC 455	Soils Science ( <i>Even fall</i> )	4
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*Co-requisite course:*

CHM 305	Organic Chemistry I ( <i>Fall</i> )	4
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\*Can take additional courses from these groups as electives.

## Combined Concentration in Aquatic and Terrestrial Ecology/Biology

	Credits
<i>Required:</i>	
ENV 419 Limnology ( <i>Fall</i> )	3
ENV 421 Limnology Laboratory ( <i>Fall</i> )	2
<i>One of*:</i>	
ENV 423 Pollution Biology ( <i>Odd spring</i> )	3
ENV 436 Water Quality Analysis ( <i>Spring</i> )	4
ENV 462 Aquatic Toxicology ( <i>Even spring</i> )	4
<i>One of*:</i>	
ENV 483 Aquatic Invertebrates ( <i>Odd spring</i> )	4
ENV 484 Fish Ecology ( <i>Even spring</i> )	3
ENV 490 Fishery Techniques & Fish Identification ( <i>Odd fall</i> )	2
<i>One of*:</i>	
ENV 400 Plant Diversity ( <i>Odd fall</i> )	4
ENV 405 Plant Ecology ( <i>Even fall</i> )	4
<i>One of*:</i>	
ENV 430 Ornithology ( <i>Even spring</i> )	4
ENV 440 Herpetology ( <i>Odd spring</i> )	4
ENV 459 Mammalogy ( <i>Odd fall</i> )	4
<i>Electives: 10-13 credits chosen by advisement from:</i>	
ENV 319 Biological Oceanography ( <i>irregularly offered</i> )	3
ENV 406 Wildlife Ecology ( <i>Even fall</i> )	3
ENV 427 Animal Behavior ( <i>Even fall</i> )	3
ENV 435 Restoration Ecology ( <i>Odd spring</i> )	3
ENV 437 Biostatistics ( <i>Fall</i> )	3
ENV 439 Conservation Biology ( <i>Even fall</i> )	3
ENV 444 Terrestrial Ecosystem Ecology ( <i>Even spring</i> )	3
ENV 446 Wetland Ecology ( <i>Odd fall</i> )	4
ENV 457 Marine Biology-Bahamas	3
ENV 464 Aquaculture I ( <i>Odd fall</i> )	4
ENV 476 Animal Ecophysiology ( <i>Odd fall</i> )	3
ENV 477 Field Biology ( <i>Odd summer</i> )	4
ENV 488 Environmental Impact Analysis ( <i>Even summer</i> )	4-6
ENV 498 Collaborative Research ( <i>Each semester</i> )	1-3
ESC 313 Environmental Climatology ( <i>Spring</i> )	3
ESC 412 Hydrology ( <i>Odd fall</i> )	4

ESC 418	Watershed Sciences ( <i>Odd spring</i> )	3
ESC 431	Environmental Applications of Geographic Information Systems ( <i>Spring</i> )	3
ESC 455	Soils Science ( <i>Even fall</i> )	4
GEL 462	Groundwater ( <i>Odd spring</i> )	4
<i>Co-requisite course:</i>		
CHM 305	Organic Chemistry I ( <i>Fall</i> )	4

## Concentration in Wetland Ecology

<i>Required:</i>		Credits
ENV 400	Plant Diversity ( <i>Even fall</i> )	4
ENV 446	Wetland Ecology ( <i>Odd fall</i> )	4
ENV 448	Northern Wetlands ( <i>Even spring</i> )	3
ESC 412	Hydrology ( <i>Fall</i> )	4
ESC 455	Soils Science ( <i>Fall</i> )	3
<i>One of:</i>		
ENV 406	Wildlife Ecology ( <i>Even fall</i> )	4
ENV 483	Aquatic Invertebrates ( <i>Odd spring</i> )	4
ENV 490	Fishery Techniques & Fish Identification ( <i>Odd fall</i> )	2
<i>Electives: 6-8 credits chosen by advisement from:</i>		
ENV 405	Plant Ecology ( <i>Odd fall</i> )	4
ENV 419	Limnology ( <i>Fall</i> )	3
ENV 435	Restoration Ecology ( <i>Odd spring</i> )	3
ENV 436	Water Quality Analysis ( <i>Spring</i> )	4
ENV 437	Biostatistics ( <i>Fall</i> )	3
ENV 439	Conservation Biology ( <i>Even fall</i> )	3
ENV 440	Herpetology ( <i>Odd spring</i> )	4
ENV 488	Environmental Impact Analysis ( <i>Even summer</i> )	4-6
ENV 498	Collaborative Research ( <i>Fall, spring, summer</i> )	1-3
ESC 418	Watershed Science ( <i>Spring</i> )	3
ESC 431	Environmental Applications of Geographic Information Systems ( <i>Spring</i> )	3
<i>Co-requisite course:</i>		
CHM 305	Organic Chemistry I ( <i>Fall</i> )	4

## Concentration in Environmental Chemical Analysis

*Required:*

CHM 301	Chemical Safety ( <i>Fall</i> )	1
CHM 305	Organic Chemistry I ( <i>Fall</i> )	4
CHM 306	Organic Chemistry I ( <i>Spring</i> )	1
ENV 423	Biology of Pollution ( <i>Odd spring</i> )	3
ENV 436	Water Quality Analysis ( <i>Spring</i> )	4
ENV 462	Aquatic Toxicology ( <i>Even spring</i> )	
CHM 457	Geochemistry ( <i>Even fall</i> )	4

*Electives:*

*Five credits minimum:*

ENV 419	Limnology ( <i>Fall</i> )	3
ENV 421	Limnology Laboratory ( <i>Fall</i> )	2
ENV 437	Biostatistics ( <i>Fall</i> )	3
ENV 476	Animal Ecophysiology ( <i>Odd fall</i> )	3
ENV 488	Environmental Impact Analysis ( <i>Even summer</i> )	4-6
ENV 498	Collaborative Research ( <i>Each semester</i> )	1-3

## Concentration in Earth Sciences

*Twenty credits chosen by advisement:*

Credits

ENV 419	Limnology ( <i>Fall</i> )	3
ENV 421	Limnology Laboratory ( <i>Fall</i> )	2
ENV 436	Water Quality Analysis ( <i>Spring</i> )	4
ENV 488	Environmental Impact Analysis ( <i>Even summer</i> )	4-6
ENV 498	Collaborative Research ( <i>Each semester</i> )	1-3
ESC 313	Environmental Climatology	3
ESC 314	Climatology Laboratory ( <i>Spring</i> )	1
ESC 325	Wetland Systems ( <i>Fall</i> )	3
ESC 350	Computational Methods ( <i>Each semester</i> )	3
ESC 412	Hydrology ( <i>Odd fall</i> )	4
ESC 418	Watershed Sciences ( <i>Odd spring</i> )	3
ESC 420	Atmospheric Sensing Methods ( <i>Even spring</i> )	3
ESC 421	Air Pollution Meteorology ( <i>Odd spring</i> )	3

ESC 431	Environmental Applications of Geographic Information Systems ( <i>Spring</i> )	4
ESC 455	Soils Science ( <i>Even fall</i> )	3
ESC 457	Marine Geology-Bahamas ( <i>Fall</i> )	3
ESC 464	Environmental Internship ( <i>Each semester</i> )	1-3
GEL 415	Geomorphology ( <i>Odd fall</i> )	4
GEL 457	Geochemistry ( <i>Even spring</i> )	3
GEL 462	Groundwater ( <i>Odd spring</i> )	4
<i>Corequisite: choose one of:</i>		
PHS 205	Introduction to Physics ( <i>Fall</i> )	4
PHS 235	Physics I ( <i>Fall</i> )	4
CHM 305	Organic Chemistry I ( <i>Fall</i> )	4

*New and revised Course Registration forms have been submitted to the Registrar in order to update Banner.*

### **Environmental Minors-Environmental Science/Environmental Studies**

The environmental *science* minor (18 credits) prepares students for postgraduate education or employment in environmentally related fields. To ensure maximum breadth and depth of training, the schedule of elective courses for the minor in environmental science must be in disciplines other than the student's own major and be formally developed with the department Chair.

<i>Required courses:</i>		Credits
ENV 202	Environmental Science	4
ENV 303	Ecology	4
ENV 452	Environmental Laws and Regulations	3
300 and 400-level ENV electives by advisement (7 credits minimum)		

The environmental *studies* minor (18 credits) offers students a variety of scientific, social, economic, political, and literary perspectives on environmental issues. Gaining these perspectives will help students become environmentally literate citizens and employees.

<i>Required courses:</i>		Credits
ENV 202	Environmental Science	4
ENV 303	Ecology	4

ENV 452 Environmental Laws and Regulations 3

*Elective courses by advisement (7 credits minimum):*

ANT 316 Food and Culture 3

ANT 323 Anthropological Perspectives on Global Issues 3

ANT 325 Indigenous Peoples and Globalization 3

CHM 372 Environmental Issues 3

ENV 469 American Literature & Environmental Imagination 3

ESC 364 Water Resource Issues 3

GEL 362 Energy & Mineral Resources Issues 3

HLS 303 Environmental Health 3

HST 302 History of Science & Technology in America 3

HST 407 American Environmental History 3

PLS 338 Global Issues 3

SOC 306 Development and Globalization 3

SOC 495 Environmental Sociology 3