

ENVIRONMENTAL SCIENCE, B.S.

Contact

Noah Perlut, Ph.D.
Assistant Director, School of Marine and Environmental Programs
nperlut@une.edu

Mission

Environmental Science program strives to increase awareness and appreciation of human connections with the rest of nature and to stimulate advocacy for sustainable behaviors. The curriculum stresses sound interdisciplinary understanding of natural sciences, social sciences, and humanities disciplines in order to explore past, present, and potential ways of living on the earth. We are concerned with environmental issues at local, regional, national, and global levels, and we especially desire to help individuals and communities practice sustainable living by means of our research, teaching, and service. Faculty and students collaborate in active and critical learning through community discourse, personal inquiry, and experiential learning. We intend that our students develop a personal aesthetic awareness of the earth and that they engage in the inquiry, discovery, critical thinking, and debate that characterize the study of environmental issues.

Major Description

The environmental programs offer majors in Environmental Science, Environmental Studies, and Sustainability and Business (offered jointly with the College of Business). All three majors build upon a sound foundation in basic science, and both provide broad explorations of human interaction with the environment.

During the first two years of the Environmental Science and Environmental Studies majors, course requirements are similar. The difference between the two majors emerges during the final two years in course selection: Environmental Science emphasizes scientific aspects of environmental questions, while Environmental Studies emphasizes humanistic, social, and political aspects.

During the first year both majors take courses in Environmental Issues, Biology, Literature, Nature, and the Environment (or appropriate substitute), Political Ecology and Economic Justice. This two-semester program, called the Blue Green Learning Community (BGLC), provides an interdisciplinary framework to explore fundamental themes of environmental studies. Moreover, it develops academic, social, and affective skills necessary for successful college learning and collaborative professional work.

During the second year, students look more deeply into the nature of environmental issues by taking courses in Environment and Society; Conservation and Preservation; and Environmental Policy. In addition, the Field Methods in Conservation course teaches conservation field skills and data analysis and environmental communication arts. These interdisciplinary environmental issues courses ensure a broad understanding while preparing students for more advanced study.

In their third year, students in both majors take BIO 350 Ecology. In their third and fourth years, aided by a faculty advisor, students choose advanced courses according to their interests and career plans. Environmental Science majors choose science electives in

Environmental Science as well as in Environmental Studies, GIS, Biology, Chemistry, Physics, Marine Biology and Animal Behavior. Environmental Studies majors in the third and fourth years choose advanced courses from the following distribution groups: Conservation, Preservation, and Restoration; Environmental Policy and Management; Arts, Humanities, and Values; Global Ecology and Social Justice.

In both majors, the advanced courses stress deeper understanding and involve problem-solving. Some courses examine the ways that human attitudes affect our environment, while other courses deal with hands-on tasks such as designing a conservation area, restoring a natural ecosystem, or considering technologies to reduce pollution. To ensure an intense direct experience of the natural world, the School of Marine and Environmental Programs offers a variety of field study courses. The curriculum culminates with the senior capstone in Sustainability in which students apply the knowledge and skills they have acquired to an in-depth study of the concept.

Philosophy

Because the study of environmental issues requires knowledge from a wide range of subjects, the School of Marine and Environmental Programs maintains a firm commitment to interdisciplinary education in our curriculum. Core courses in the School of Marine and Environmental Programs utilize knowledge and concepts drawn from the basic sciences as well as from the humanities and social sciences. Upper-division courses investigate environmental questions through disciplines such as literature, anthropology, economics, biology, history, political science, geographic information systems, chemistry, physics, and ecology. Through all four years, our curriculum develops the skills necessary for dealing with environmental problems: writing, speaking, critical thinking, computing, research techniques, and media arts. The Environmental Studies Program prepares students to become informed citizens, competent professionals, and lifelong learners.

The Blue Green Learning Community

As mentioned above, all entering first-year environmental students participate in a year-long learning community focused on the fundamental themes of environmental studies. The Blue Green Learning Community includes courses as follows: eight credits of biology, three credits of literature (or an appropriate substitute), three credits of social science, and three credits of environmental issues for a total of 17 credits over 2 semesters. This interdisciplinary approach enables students to understand more clearly the complexity of environmental issues and improve skills in critical thinking, writing, oral communication, research, and the use of computers at the same time. Experiential learning activities are central.

Internships and Careers

Internships provide students with opportunities to practice learned skills in an actual work environment with the guidance of an internship coordinator, who helps students match their interests with a work experience that might take place locally, regionally, nationally, or internationally. Internships provide career exploration and can help establish professional networks that lead to career opportunities upon graduation. The interdisciplinary nature of Environmental Studies and Environmental Science is reflected in the wide variety of careers open to graduates, such as air and water resource management, ecological restoration, education, habitat conservation, park management, toxicology, field research, journalism, environmental advocacy, environmental impact assessment, law and regulation, and environmental

health. Our graduates enter both master's and doctoral programs in several of these fields.

Double Major

It is possible for students to add a second major or minor. Students interested in a double major should consult with their faculty advisor, who in turn will coordinate with an advisor from the second program.

Admissions

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

Transfer Credit

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

Financial Information

Tuition and fees for subsequent years may vary. Other expenses include books and housing. For more tuition and fee information, please consult this catalog's Financial Information (<https://catalog.une.edu/undergraduate/financial-information-undergraduate-programs/>) section.

Curricular Requirements

The faculty in UNE's three colleges offering undergraduate programs have defined health of natural ecosystems as a major theme in the Nor'easter Core Curriculum. As part of the Nor'easter Core, the environmental studies programs within the School of Marine and Environmental Programs delivers courses like Introduction to Environmental Issues to all undergraduates regardless of major. The UNE College of Arts and Sciences is one of the few in the nation to require formal instruction in the health of natural ecosystems as a requirement for graduation.

Code	Title	Hours
Nor'easter Core Requirements		
Nor'easter Core Requirements (https://catalog.une.edu/undergraduate/core-curriculum/)		40
Program Required Courses		
BIO 105 & 105L	Biology I: Ecology/Evolution and Bio I: Ecology/Evolution Lab	4
BIO 106 & 106L	Biology II: Cellular/Molecular and Bio II: Cellular/Molecular Lab	4
BIO 350 & 350L	Ecology and Ecology Lab (third year)	4
BUEC 104 & BUEC 105 or ENV 130	Economics in Context and Economics in Context Political Ecology and Economic Justice	3
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
ENV 104 or ENV 105	Sustainability for a Healthy Planet BGLC: Sustainability for a Healthy Planet	3
ENV 124	Lit, Nature & the Environment	3
ENV 200	Environment and Society: A Global Perspective	3
ENV 215	Field Methods in Conservation	3
ENV 220	Conservation and Preservation	3

ENV 250	Envir Policy Compar Perspect	3
ENV 499	Senior Capstone in Envntl Studi	3
GIS 161	GIS I: Fundamentals of Geospatial Science and Technology	3
MAT 151 or MAT 150	Statistics for Environmental Sciences Statistics for Life Sciences	3
Fifteen Credits of Upper Division Science Electives ¹		15
Two courses from different distribution groups in the list of Environmental Studies Distribution Requirements		6-8
ENV 295 & ENV 495 or ENV 495	Environmental Internship and Adv. Environmental Internship ² Adv. Environmental Internship	3-12
Open Elective Courses (Students complete open elective credits as necessary to meet the University's 120-credit minimum for graduation. The total number of elective credits required will depend on the student's completed program, core, and other degree requirements.)		6
Total Hours		120-131

¹ Upper-Division Science Electives – After consulting with their academic advisors, Environmental Science majors will choose at least 15 credit hours of upper-division science courses in Environmental Science, Biology, Marine Science, Chemistry, Physics, or Animal Behavior. (This group of courses should be taken during the third and fourth years.)

² Up to 12 credits of ENV 295 Environmental Internship and/or ENV 495 Adv. Environmental Internship may be arranged with special permission from the Director of the School of Marine and Environmental Programs

Please note: While some courses can fulfill both core and program requirements, the credits earned do not count twice towards the minimum total required credits for the degree.

Environmental Studies Distribution Requirements List

Code	Title	Hours
Group A – Conservation, Preservation, Restoration		
ENV 309	(Sustainability and Ecological Restoration)	3
ENV 312 & 312L	Wetland Conservation & Ecology and Wetland Conserv & Ecology Lab	4
ENV 313 & 313L	Wetland Rest: Science & Policy and Wetland Rest: Science&Pol Lab	4
ENV 317	(Case Studies in Preserving Biodiversity and Protected Areas)	3
ENV 397	(Topics in Environmental Studies)	3
ENV 398	Topics ENV Studies	3
ENV 399	Topics ENV Studies w/ Field Lab	4
Group B – Environmental Policy and Management		
BUEC 390	Environmental Economics	3
BUEC 395	(Ecological Economics)	3
ENV 321	Environmental Communication: Expert Practices for Ecosystem Management	3
ENV 328	(Environmental Pollution: Ecosystems, Wildlife and Human Health)	3
ENV 357	(Sustaining Water: Social and Global Perspectives)	3
ENV 362	(Climate Change Adaptation)	3
ENV 397	(Topics in Environmental Studies)	3
ENV 398	Topics ENV Studies	3

ENV 399	Topics ENV Studies w/ Field Lab	4
Group C – Arts, Humanities, and Values		
ENV 331	Women and the Environment	3
ENV 333 & 333L	Nature Writers w/ Field Lab and Nature Writers Lab	4
ENV 334 & 334L	and (Contemporary Nature Writing w/Lab)	4
ENV 397	(Topics in Environmental Studies)	3
ENV 398	Topics ENV Studies	3
ENV 399	Topics ENV Studies w/ Field Lab	4
Group D – Global Ecology and Social Justice		
ENV 340	Environ Movemnts/Social Change	3
ENV 341	Ind Eco,Con Bio/Pol of Nature	3
ENV 344	(Environmental Ethics)	3
ENV 349 & 349L	Env, Hlth, Comm Dev E Africa and Env, Hlth, Comm Dev E Africa	4
ENV 397	(Topics in Environmental Studies)	3
ENV 398	Topics ENV Studies	3
ENV 399	Topics ENV Studies w/ Field Lab	4

The School of Marine and Environmental programs also offers minors in the following areas:

- Geographic Information Systems (<https://catalog.une.edu/programs/geographic-information-systems-minor/>)
- Climate Change Studies (<https://catalog.une.edu/programs/climate-change-studies-minor/>)
- Environmental Studies (<https://catalog.une.edu/programs/environmental-studies-minor/>)

Students wishing to pursue teacher certification in Life Science can complete a double major with Environmental Science and Middle and Secondary Education or a major in Middle and Secondary Education and a concentration in Environmental Science. For more information, see the Middle and Secondary Education (<https://catalog.une.edu/programs/middle-secondary-education-certification-bs/>) catalog page.

Students in this major can participate in the pre-health graduate school preparation tracks. (<https://catalog.une.edu/programs/science-prerequisites-health-professions/>)

Academic and Technical Standards

All courses that fulfill a degree requirement must be completed with a grade of C- or higher.

Learning Outcomes

All graduates will achieve the below learning outcomes.

Intellectual Flexibility

Students will possess the intellectual flexibility necessary to view environmental questions from multiple perspectives, prepared to alter their understanding as they learn new ways of understanding.

Problem Solving

Students will solve problems systematically, creatively, and reflexively, ready to assemble knowledge and formulate strategy.

Interdisciplinary

When encountering environmental problems students will assess necessary scientific concepts and data, consider likely social dynamics, and establish integral cultural contexts.

Research

When faced with questions that lie beyond their current knowledge base, students will actively research data, concepts, histories, and narratives necessary for adequate consideration of the issue.

Communication

Students will communicate with precision, effective art, and sound rhetoric in writing, in speech, and in digital media.

Values

Reflecting upon their internalized values system, students will continue to evolve an individual vision of harmonious and sustainable interaction among humans as well as between humans and the rest of the natural world.

Knowledge

Students will have mastered foundational knowledge enabling them to make sound life decisions as well as enter a career in an environmental profession or graduate school.

Detailed Learning Outcomes

To deal with environmental issues one must understand not only scientific concepts, but also the social interactions by which humans behave and the cultural values that underlay behaviors. Therefore, our Environmental Studies and Environmental Science programs lead to learning outcomes involving many different disciplines, or ways of knowing. We have organized our more detailed learning outcomes according to the three traditional academic categories: social sciences, natural sciences, and the humanities.

Social Sciences

- Students will be able to articulate the basic structure, functions, and processes of key social systems affecting the environment.
- Students will be able to apply specific models of social system processes derived from various social science theories to explain environmental issues (including current and past conditions), and to propose future solutions to environmental problems.
- Students will be able to identify, interpret, and apply basic measures (metrics and formulae) of social system variables to assess socio-environmental conditions.
- Students will be able to articulate a basic understanding of various social science theories/frameworks and how they apply to environmental issues.
- Students will be able to explain how various paradigms or world views and their implicit and explicit assumptions and values shape the viewer's perception of environmental problems and solutions.
- Students will be able to explain how perceptions of environmental problems, the problems themselves, and the proposed solutions are shaped by their historical, geographical, social, political, economic, and cultural contexts.
- Students will be able to assess/weigh ethical considerations as a component of environmental decision-making and problem-solving.

Natural Sciences

- Students will understand key concepts of life and physical sciences and be able to apply them to environmental issues.
- Students will understand and apply the scientific process, as well as appreciate both the potential and limitations of the process.
- Students will be able to locate, evaluate, and synthesize information from the scientific literature.
- Students will analyze data using appropriate statistical methods and will be able to evaluate the use of statistics by others in a variety of contexts.
- Students will apply knowledge of the sciences within an interdisciplinary context in solving environmental issues such as environmental health, food and agriculture, energy, waste and pollution, climate change, population, resource management, and loss of biodiversity.
- Students will carry out an applied research project in the natural sciences.
- Students will be able to communicate science effectively through written work and oral presentations to a variety of audiences.
- Students will apply the tools commonly used in field research, particularly in the study of plants, animals, and soils, and will find their way on the landscape using map, compass, and GPS technology, and use spatial analysis software such as GIS, Google Earth, and Google Maps.

Humanities

- Students will articulate historical epochs and concepts relevant to the evolution of environmental consciousness and policy.
- Students will analyze and evaluate ideological and philosophical approaches used to understand environmental relationships.
- Students will be aware of and able to analyze the potential of literature and fine arts to communicate assumptions of value about human relations with the biosphere.
- Students will articulate a coherent philosophy of the environment, and consider ethical bases for responding to environmental questions.

The third- and fourth-year curriculum of the Environmental Studies/ Science majors builds on the core learning outcomes through a process of intensification, adding depth and sophistication to students' learning of the concepts and skills specified above. For students majoring in Environmental Studies, the outcomes listed under "Social Sciences" and "Humanities" are emphasized, while the outcomes listed under "Natural Sciences" are emphasized for students majoring in Environmental Science.