Environmental Sciences

MAJOR: ECOSYSTEMS OPTION (B.S.)

https://colsa.unh.edu/natural-resources-environment/program/bs/environmental-sciences-major-ecosystems-option

Description

The College of Life Sciences and Agriculture (COLSA) and the College of Engineering and Physical Sciences (CEPS) jointly offer a bachelor of science degree in environmental sciences. Environmental science is an interdisciplinary field concerned with the interaction of biological, chemical, and physical processes that shape the environment, and control the response of natural systems to human activities. Students graduating with a degree in environmental sciences will have an understanding of these interacting processes, experience working in interdisciplinary teams to apply this understanding, and the ability to communicate effectively with both scientific and lay audiences. While in this program, students will acquire significant experience with field, laboratory and analytical methods appropriate for employment in professional environmental science positions as well as a basic understanding of environmental policy. The University of New Hampshire is a recognized leader in environmental sciences research, and the environmental sciences program capitalizes on faculty expertise in this area. Program faculty emphasize teaching and research in the areas of biogeochemical cycling, environmental chemistry, ecosystem science, global change, hydrology, plant ecology, soil science, and water resource management among many other fields.

Employment opportunities include environmental consulting firms; educational facilities (e.g., science centers), environmental monitoring laboratories (e.g., water treatment plants, the Environmental Protection Agency), government agencies (e.g., the U.S. Geological Survey, Bureau of Land Management, Natural Resource Conservation Service), university and government research laboratories, and nongovernment environmental organizations. The environmental sciences program also constitutes an excellent preparation for graduate programs in several areas relating to the environment.

The Program has four options, and specific course requirements for the major vary by option. The ecosystems and soils and watersheds options are both managed by the Department of Natural Resources and the Environment in COLSA, and the geosystems and hydrology options are both managed by Earth Sciences in CEPS.

Requirements

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Scope of the Major (Introduction - 3 Courses)</td>
<td>9</td>
<td></td>
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<tr>
<td>NR 400</td>
<td>Professional Perspectives in Natural Resources</td>
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<tr>
<td>NR 403</td>
<td>Introduction to Environmental Science</td>
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<tr>
<td>or NR 435</td>
<td>Contemporary Conservation Issues and Environmental Awareness</td>
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<tr>
<td>or NR 437</td>
<td>Principles of Sustainability</td>
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<tr>
<td>The Scientific Basis (Foundation - 7 Courses)</td>
<td>28</td>
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<tr>
<td>Biology I</td>
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<tr>
<td>BIOL 412</td>
<td>Introductory Biology: Evolution, Biodiversity and Ecology</td>
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<td>Biology II</td>
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<tr>
<td>or BIOL 411</td>
<td>Introductory Biology: Molecular and Cellular</td>
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Chemistry I:
- CHEM 403 General Chemistry I
- or CHEM 405 Chemical Principles for Engineers
- or CHEM 413 Introductory Chemistry for Life Sciences

Chemistry II:
- NR 561 Chemistry of the Environment
- or CHEM 404 General Chemistry II

Physics:
- PHYS 401 Introduction to Physics I
- or PHYS 407 General Physics I

Calculus:
- MATH 424B Calculus for Life Sciences
- or MATH 425 Calculus I

Statistics:
- BIOL 528 Applied Biostatistics I
- or EREC 525 Statistical Methods and Applications

Earth and its Systems (Core - 6 Courses) 24
- ENSC 401 Dynamic Earth
- or ENSC 402 Earth History
- or ENSC 409 Geology and the Environment

Aquatic Science:
- NR 564 Freshwater Resources

Soils:
- NR 561 Studio Soils

Climate/Weather:
- ENSC 514 Introduction to Climate
- or GEOG 473 Elements of Weather
- or GEOG 670 Climate and Society

Ecology:
- NR 527 Forest Ecology
- or NR 660 Ecology and Biogeography of New Zealand
- or BIOL 541 Ecology

Human Dimensions:
- NR 602 Natural Resources and Environmental Policy
- or NR 662 Environmental Policy, Planning and Sustainability in New Zealand
- or NR 507 Introduction to our Energy System and Sustainable Energy
- or NR 784 Sustainable Living - Global Perspectives

Environmental Toolkit (Methods - 2 Courses) 7-8
- Select two courses from the following:
  - ENSC 534 Techniques in Environmental Sciences
  - NR 658 Introduction to Geographic Information Systems
  - or ENSC 777 GIS for Earth & Environmental Sciences
  - or FORT 581 Applied Geospatial Techniques
  - NR 757 Remote Sensing of the Environment
  - or ENSC 778 Remote Sensing Earth & Environmental Sciences

Ecosystem Integration (Advanced Topics - 4 Courses) 16
- Population and Community Ecology
  - NR 765 Community Ecology
  - or NR 734 Tropical Ecology
  - or NR 706 Soil Ecology
  - or NR 660 Ecology and Biogeography of New Zealand
  - or NR 640 Wildlife Population Ecology
  - or NR 642 Introduction to Biogeography
  - or NR 603 Landscape Ecology
  - or BIOL 720 Plant-Animal Interactions

Ecologies:
- NR 730 Terrestrial Ecosystems
- or NR 781 Aquatic Ecosystems
- or NR 661 Restoration Ecology and Ecosystem Management in New Zealand

Biogeochemistry:
- NR 744 Biogeochemistry
- or NR 761 Environmental Soil Chemistry
- or NR 703 Watershed Water Quality Management
- or ENSC 642 Biogeochemistry in the Earth System

Environmental Problem Solving:
Environmental Sciences Major: Ecosystems Option (B.S.)

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<tr>
<th>Course</th>
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<tr>
<td>ESCI 654</td>
<td>Fate and Transport in the Environment</td>
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<tr>
<td>or NR 707</td>
<td>Environmental Modeling</td>
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<tr>
<td>or EREC 760</td>
<td>Ecological-Economic Modeling for Decision Making</td>
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<td>or NR 749</td>
<td>Forest Inventory and Modeling</td>
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<td>or NR 743</td>
<td>Ecology and Society in a Changing Arctic</td>
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Integration and Research (The Capstone Experience) 1-2

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<th>Capstone:</th>
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<tr>
<td>NR 663</td>
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<td>or NR 786</td>
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<td>or NR 795</td>
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<td>or NR 799</td>
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Capstone: NR 663 (EcoQuestif Senior Year)(WI), or NR 786, or NR 795, or NR 799, or approved research experience, or approved internship. Every student must complete a capstone experience senior year, or during the summer before senior year if at least 90 credit hours have been completed.

NR791 – Preparation for Capstone (1 credit, pass/no credit) is offered every spring. While not required for graduation, it is recommended for second semester juniors who need guidance in terms of developing a capstone project and completing the Capstone Contract.

Individualizing Your Education (Electives)

One goal of this program is to allow students the opportunity to pursue minors, dual majors, research and study abroad opportunities, while still completing the degree in four years of full-time enrollment. To this end, the program requires a total of 85 credit hours. The University Discovery program includes 5 areas (20 credit hours) not covered by this major. These include English 401, Fine and Performing Arts, Humanities, Historical Perspectives, World Cultures (NOTE: The World Cultures category can be met by certain study abroad programs, including EcoQuest). Combined, Major and Discovery requirements total 105 credit hours. With a total of 128 credit hours required by the University for graduation, this leaves 23 credit hours that can be put towards minors, dual majors, study abroad, Directed Research, etc.

Total Credits 84-85

1. Many students enroll in the EcoQuest program (a study abroad opportunity in New Zealand), which satisfies the policy requirement, and capstone requirement if taken senior year.

2. NR 791 Preparation for Capstone - is offered every spring. While not required for graduation, it is recommended for second semester juniors who need guidance in terms of developing a capstone project and completing the Capstone Contract.