ENVIRONMENTAL CONSERVATION AND SUSTAINABILITY MAJOR (B.S.)

https://colsa.unh.edu/natural-resources-environment/program/bs/environmental-conservation-sustainability-major

### ECS Major Curriculum

The ECS major is comprised of 14 core requirements providing integrative courses in both environmental conservation and sustainability, along with a foundation in biology, ecology, physical and social science, and the basic tools and skills applied to problem solving. These core requirements are typically fulfilled in the first two years. Beginning in their junior year, ECS students, in consultation with their advisers, create a seven course focus area based on an ecological system or natural resource of their choosing. The focus area provides advanced study in ecology and natural resources; social sciences; tools, skills, and/or natural history and should reflect the student’s interests and future goals. Additionally, each ECS student completes a practicum experience and a capstone option.

The ECS major provides the opportunity for students to gain a common foundation of knowledge and skills emphasizing integration and critical thinking, while allowing for sufficient flexibility to pursue their interests and passions within a large and complex field of study. The design of the curriculum will allow each student at least four, and as many as six, free electives, which they may fulfill as they choose. Many students pursue international experiences, such as the UNH EcoQuest program in New Zealand, add a minor or dual degree (such as the dual degree in international studies), and/or pursue research opportunities with our faculty or through another of UNH’s undergraduate research opportunity programs.

### Requirements

#### ECS Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR 435</td>
<td>Contemporary Conservation Issues and Environmental Awareness</td>
<td></td>
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<tr>
<td>NR 437</td>
<td>Principles of Sustainability</td>
<td></td>
</tr>
<tr>
<td>BIOL 412</td>
<td>Introductory Biology: Evolution, Biodiversity and Ecology</td>
<td></td>
</tr>
<tr>
<td>NR 439</td>
<td>Environmental Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 541</td>
<td>Ecology</td>
<td>4</td>
</tr>
<tr>
<td>NR 527</td>
<td>Forest Ecology</td>
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</tr>
<tr>
<td>SAFS 502</td>
<td>Agroecology</td>
<td></td>
</tr>
<tr>
<td>NR 403</td>
<td>Introduction to Environmental Science</td>
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<tr>
<td>NR 458</td>
<td>The Science of Where</td>
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</tr>
<tr>
<td>CHEM 403</td>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHE 410</td>
<td>Energy and Environment</td>
<td></td>
</tr>
<tr>
<td>ESCI 409</td>
<td>Geology and the Environment</td>
<td></td>
</tr>
<tr>
<td>CEE 520</td>
<td>Environmental Pollution and Protection: A Global Context</td>
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</tr>
<tr>
<td>PHYS 401</td>
<td>Introduction to Physics I</td>
<td></td>
</tr>
</tbody>
</table>

#### Social Science:

**Resource Economics:**
- EREC 411 | Environmental and Resource Economics Perspectives |
- NR 701 | Ecological Sustainability and Values |
- NR 784 | Sustainable Living - Global Perspectives |
- SOC 565 | Environment and Society |

- Natural Resources Policy: Select one of the following (4 credits)
  - NR 602 | Natural Resources and Environmental Policy |
  - NR 662 | Environmental Policy, Planning and Sustainability in New Zealand |

#### Essential Tools and Skills:

- **Field Methods:**
  - NR 415 | Natural Resources Field Methods |

- **Statistics:** Select one of the following (4 credits)
  - BIOL 528 | Applied Biostatistics I |
  - EREC 525 | Statistical Methods and Applications |

- **Geospatial Analysis:**
  - NR 658 | Introduction to Geographic Information Systems |

- **Writing Skills:** Select one of the following (4 credits)
  - ENGL 502 | Professional and Technical Writing |
  - ENGL 503 | Persuasive Writing |
  - ENGL 521 | Nature Writers |

- **Presentation Skills:** Select one of the following (4 credits)
  - CMN 500 | Public Speaking |
  - THDA 522 | Presenting Science to the General Public |
  - THDA 583 | Introduction to Puppetry |
  - THDA 522 | Storytelling, Story Theatre, and Involvement Dramatics |
  - THDA 624 | Theatre for Young Audiences |

- **Focus Area:**
  - Select seven total courses to create a focus area addressing an environmental issue, ecological system, or natural resource (see below) (28 credits)

- **Ecology and Natural Resources:**
  - Select one to four courses: no more than one course may be at the 400 or 500 level. Additional courses must be at the 600 or 700 levels.
  - ESCI 405 | Global Environmental Change |
  - MEFB 755 | Biological Oceanography |
  - NR 433 | Wildlife Ecology |
  - NR 518 | Studio Soils |
  - NR 502 | Forest Ecosystems and Environmental Change |
  - NR 504 | Freshwater Resources |
  - NR 663 | Landscape Ecology |
  - NR 625 | Physiological Ecology |
  - NR 640 | Wildlife Population Ecology |
  - NR 642 | Introduction to Biogeography |
  - NR 660 | Principles of Conservation Biology |
  - NR 660 | Ecology and Biogeography of New Zealand |
  - NR 661 | Restoration Ecology and Ecosystem Management in New Zealand |
  - NR 663 | Applied Directed Research in New Zealand |
  - NR 664 | Conservation Genetics |
  - NR 706 | Soil Ecology |
  - NR 711 | Wetland Ecology and Management |
  - NR 730 | Terrestrial Ecosystems |
  - NR 734 | Tropical Ecology |
  - NR 743 | Ecology and Society in a Changing Arctic |
  - NR 744 | Biogeochemistry |
  - NR 751 | Aquatic Ecosystems |
  - NR 761 | Environmental Soil Chemistry |
  - NR 765 | Community Ecology |
  - NR 782 | Forest Health in a Changing World |
  - MEFB 717 | Lake Ecology |
  - MEFB 725 | Marine Ecology |
  - MEFB 747 | Aquatic Plants in Restoration/Management |
  - SAFS 760 | Insect Pest Management |
  - MEFB 628 | Marine Invertebrate Evolution and Ecology |
The ECS major capstone experience may be filled by any one (1) of the following options:

**Senior Capstone Options**
Select at least one course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEB 674</td>
<td>Ecology and Marine Environment</td>
</tr>
<tr>
<td>MEB 702</td>
<td>Sustainable Marine Fisheries</td>
</tr>
<tr>
<td>MEB 772</td>
<td>Fisheries Biology Conservation and Management</td>
</tr>
</tbody>
</table>

**Social Sciences**
Select two to five courses: no more than one course may be at the 400 or 500 level. Additional courses may be at the 600 or 700 levels.

- CEP 415: Community Development Perspectives
- CEP 508: Applied Community Development
- NR 507: Introduction to our Energy System and Sustainable Energy
- NR 606: International Energy Topics
- NR 643: Economics of Forestry
- NR 662: Environmental Policy, Planning and Sustainability in New Zealand
- NR 701: Ecological Sustainability and Values
- NR 720: International Environmental Politics and Policies for the 21st Century
- NR 724: Resolving Environmental Conflicts
- NR 784: Sustainable Living - Global Perspectives
- NR 787: Advanced Topics in Sustainable Energy
- ANTH 635: Globalization and Global Population Health
- CEP 614: Fundamentals of Planning
- CEP 673: Green Real Estate
- ECON 605: Intermediate Microeconomic Analysis
- ECON 645: International Economics
- ECON 668: Economic Development
- ECON 706: Economics of Climate Change
- EREC 572: Introduction to Natural Resource Economics
- EREC 606: Land Economics Perspectives: Uses, Policies, and Taxes
- EREC 627: Community Economics
- EREC 680: Agricultural and Food Policy
- EREC 708: Environmental Economics
- EREC 756: Rural and Regional Economic Development
- GEOG 673: Political Ecology
- HIST 618: American Environmental History
- POL 751: Comparative Environmental Politics and Policy
- SOC 665: Environmental Sociology
- SOC 730: Communities and the Environment
- TOUR 400: Introduction to Tourism

**Advanced Tools & Skills and Natural History**
Select at least one course

<table>
<thead>
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<th>Course Code</th>
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<tbody>
<tr>
<td>NR 425</td>
<td>Field Ornithology</td>
</tr>
<tr>
<td>NR 655</td>
<td>Vertebrate Biology</td>
</tr>
<tr>
<td>NR 703</td>
<td>Watershed Water Quality Management</td>
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<tr>
<td>NR 707</td>
<td>Environmental Modeling</td>
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<tr>
<td>NR 712</td>
<td>Mammalogy</td>
</tr>
<tr>
<td>NR 713</td>
<td>Quantitative Ecology</td>
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<tr>
<td>NR 729</td>
<td>Silviculture</td>
</tr>
<tr>
<td>NR 745</td>
<td>Forest Management</td>
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<tr>
<td>NR 749</td>
<td>Forest Inventory and Modeling</td>
</tr>
<tr>
<td>NR 757</td>
<td>Remote Sensing of the Environment</td>
</tr>
<tr>
<td>NR 759</td>
<td>Digital Image Processing for Natural Resources</td>
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<td>NR 760</td>
<td>Geographic Information Systems in Natural Resources</td>
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<tr>
<td>NR 785</td>
<td>Systems Thinking for Sustainable Solutions</td>
</tr>
<tr>
<td>SOC 601</td>
<td>Methods of Social Research</td>
</tr>
<tr>
<td>BIOL 752</td>
<td>New England Mushrooms: a Field and Lab Exploration</td>
</tr>
<tr>
<td>CEP 777</td>
<td>Topics in Community Planning</td>
</tr>
<tr>
<td>TOUR 767</td>
<td>Social Impact Assessment</td>
</tr>
<tr>
<td>MEB 719</td>
<td>Field Studies in Lake Ecology</td>
</tr>
<tr>
<td>MEB 732</td>
<td>Lake Management</td>
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<tr>
<td>ZOOL 542</td>
<td>Ornithology</td>
</tr>
</tbody>
</table>

**Senior Capstone Options**
The ECS major capstone experience may be filled by any one (1) of the following options:  

1. **Option 1:** Leadership for Sustainability
   - NR 786: Leadership for Sustainability

2. **Option 2:** Both seminars must be scheduled. At least one must be taken in the senior year:
   - NR 753: Critical Issues in Sustainability: Sustainability as an Abundance Paradigm
   - NR 754: Critical Issues in Sustainability: Sense of Place

3. **Option 3:**
   - NR 663: Applied Directed Research in New Zealand (NZ Directed projects, if taken in the senior year)

4. **Option 4:**

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**Work Experience**
- NR 660: Work Experience

**Total Credits:** 60

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1. The focus area is based upon at least one course in the ecology and natural resources category, along with a combination of courses in the social sciences; tools, skills, and natural history categories; and any additional courses from the ecology and natural resources category reflecting the student's interests and future direction. Focus areas should be designed in close consultation with the adviser. Courses used to fulfill core requirements may not be used in the focus area.

2. If NR 663 Applied Directed Research in New Zealand is taken in the junior year or earlier, then one Critical Issues seminar (2cr) or Leadership for Sustainability must be taken in the senior year to fulfill the capstone requirement.

3. Each ECS major will engage in a practical experience reflecting their interests and goals. The choice of the experience will be made in conjunction with the adviser and may occur any time beginning with the sophomore year.

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**Degree Plan**

**Sample Course Sequence for Environmental Conservation and Sustainability**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
<td><strong>Fall</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>BIOL 412</td>
<td>Introductory Biology: Evolution, Biodiversity and Ecology (Inquiry, Disc BS)</td>
<td>4</td>
</tr>
<tr>
<td>NR 435</td>
<td>Contemporary Conservation Issues and Environmental Awareness (Disc ETS)</td>
<td>4</td>
</tr>
<tr>
<td>EREC 411</td>
<td>Environmental and Resource Economics Perspectives (or Discovery Course, not SS or ETS)</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 401 or Discovery Course</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td><strong>Second Year</strong></td>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>NR 437</td>
<td>Principles of Sustainability</td>
<td>4</td>
</tr>
<tr>
<td>NR 439</td>
<td>Environmental Biology</td>
<td>4</td>
</tr>
<tr>
<td>EREC 411</td>
<td>Environmental and Resource Economics Perspectives (or Discovery Course, not SS or ETS)</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 401 or Discovery Course</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td><strong>Fall</strong></td>
<td><strong>Credits</strong></td>
</tr>
<tr>
<td>NR 415</td>
<td>Natural Resources Field Methods</td>
<td>2</td>
</tr>
<tr>
<td>Ecological Principles</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Physical Science (Disc PS)</td>
<td>2</td>
<td></td>
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<tr>
<td>Presentation Skills (possible Disc FPA)</td>
<td>2</td>
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</tr>
<tr>
<td>Practicum (possible Disc FPA)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
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### Elective
- **Credits**: 4

### Spring
- **Statistics (Disc QR)**: 2
- **Writing Skills (Univ. writing req.)**: 2
- **NR 658 Introduction to Geographic Information Systems**: 4
- **NR 602 or Discovery Course**: 4

### Credits
- **Total Credits**: 18

### Third Year
#### Fall
- **NR 602 or Discovery Course**: 4
- **Ethics/Values Requirement**: 4
- **Focus Area Courses**: 8
  - OR **Electives**: 4
  - OR any remaining Discovery or WI requirement
  - OR **Capstone**: 4

### Credits
- **Total Credits**: 16

#### Spring
- **Focus Area Courses**: 5
  - OR **Electives**: 16
  - OR any remaining Discovery or WI requirements
  - OR **Capstone**: 4

### Credits
- **Total Credits**: 16

### Fourth Year
#### Fall
- **Capstone Requirement**: 5
  - 2-4
- **Focus Area Courses**: 12
  - OR **Electives**: 12
  - OR any remaining Discovery of WI requirements

### Credits
- **Total Credits**: 14-16

#### Spring
- **Capstone Requirement**: 5
  - 2-4
- **Focus Area Courses**: 12
  - OR **Electives**: 12
  - OR any remaining Discovery of WI requirements

### Credits
- **Total Credits**: 14-16

### Total Credits
- **Total Credits**: 126-130

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1. All choices for the Ecological Principles requirement except for SAFS 502 are fall courses.
2. The Statistics, Physical Science, Writing Skills and Presentation Skills requirements may be taken in either the Fall or Spring Semester of the second year.
3. Work experience, internship, etc may be scheduled any time beginning in the second year.
4. One of the 2 credit capstone seminars may be taken in either the fall or spring of the junior year.
5. One 2 credit seminar may be taken in each of the Fall and Spring semesters of the Senior Year OR NR 786 may be taken in the Fall semester of the Senior Year.

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### Student Learning Outcomes

Students will be able to:

- Evaluate the validity and limitations of scientific theories and claims about the environment;
- Describe and explain the interactions among physical, biological, chemical, and human components of the environment;
- Formulate tests of environmental questions, acquire data, and apply scientific methods to answer these questions;
- Characterize the various social drivers of environmental problems and the relative attributes of policy instrument solutions;
- Locate, evaluate, and summarize print and electronic media including peer-reviewed literature and then compose and deliver informed positions on current environmental problems to the public;
- Describe and explain the ecological and societal value of biodiversity, sustainability, and environmental stewardship;
- Master mathematical, statistical, and study design knowledge and skills, and use state-of-the-art software, hardware, and analytical techniques relevant to environmental conservation and sustainability;
- Use principles of ecology, economics, sustainability, and policy science to solve real-world environmental problems;
- Communicate effectively to peers within the environmental community and with audiences outside of the discipline.