ENVIRONMENTAL SCIENCES MAJOR

The major in Environmental Sciences has two tracks: one in science (Science Track) and one in economic policy (Policy Track). The tracks share foundation courses in science and math, and the core curriculum. Advanced coursework differs by track.

Students plan their academic paths with an environmental sciences adviser. Many foundation courses are prerequisites for advanced courses and should be completed as soon as possible. Students envisioning graduate training are specifically encouraged to take additional math and/or the General Physics sequence. Students interested in medical professions and environmental biology are advised to take the full 200-level sequence in biological sciences and two additional quarters of organic chemistry.

Students must also complete the Undergraduate Registration Requirement (https://catalogs.northwestern.edu/undergraduate/requirements-policies/undergraduate-registration-requirement/) and the degree requirements of their home school.

Major Requirements: Program Courses (11 units)

3 Core Environmental Science Courses at the 200-Level

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVR_SCI 201-0</td>
<td>Earth: A Habitable Planet</td>
</tr>
<tr>
<td>ENVR_SCI 202-0</td>
<td>The Health of the Biosphere</td>
</tr>
<tr>
<td>ENVR_SCI 203-0</td>
<td>Humans and the Environment</td>
</tr>
</tbody>
</table>

8 Advanced Studies Courses

Advanced studies courses differ by the chosen track. In both the science track and the policy track at least 6 of the required 8 advanced studies courses must be at the 300-level. See the Advanced Studies Course Lists (p. 2) below for lists of approved courses. See the Environmental Sciences webpage (https://www.envsci.northwestern.edu/undergraduate-program/major-requirements.html) for updates to these lists. Students who double-major in economics and environmental sciences are encouraged to do the science track in environmental sciences, and must take extra 300-level economics classes to fulfill the requirements for both majors.

Science Track Advanced Studies Course Requirements

- 6 courses from the Science List (p. 2). Up to 2 of these may be replaced with ENVR_SCI 399-0 research courses.
- 2 courses from the Environment and Society List (p. 2).

Policy Track Advanced Studies Course Requirements

- 4 courses from the Science List (p. 2).
- 2 required economics courses: ECON 281-0 and ECON 310-1.
- 1 additional economics course chosen from: ECON 371-0, ECON 372-0, or ECON 373-0.
- 1 course selected from either the Science List (p. 2) or the Environment and Society List (p. 2).

Major Requirements: Foundations in Science and Math (9.68-12.38 units)

Required Math and Chemistry Courses

Students should complete all of the following math and chemistry courses in their first two years. Total units depend on math sequence taken. Courses may double-count with another major or minor.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MATH 220-1</td>
<td>Single-Variable Differential Calculus</td>
</tr>
<tr>
<td>or MATH 218-1 &amp; MATH 218-2</td>
<td>Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus</td>
</tr>
<tr>
<td>MATH 220-2</td>
<td>Single-Variable Integral Calculus</td>
</tr>
<tr>
<td>or MATH 218-3</td>
<td>Single-Variable Calculus with Precalculus</td>
</tr>
<tr>
<td>CHEM 131-0</td>
<td>General Chemistry 1</td>
</tr>
<tr>
<td>&amp; CHEM 141-0</td>
<td>and General Chemistry Laboratory 1</td>
</tr>
<tr>
<td>&amp; CHEM 132-0</td>
<td>and General Chemistry 2</td>
</tr>
<tr>
<td>&amp; CHEM 142-0</td>
<td>and General Chemistry Laboratory 2 (Pre-requisite: CHEM 110-0)</td>
</tr>
<tr>
<td>or CHEM 151-0</td>
<td>Accelerated General Chemistry 1</td>
</tr>
<tr>
<td>&amp; CHEM 161-0</td>
<td>and Accelerated General Chemistry Laboratory 1</td>
</tr>
<tr>
<td>&amp; CHEM 152-0</td>
<td>and Accelerated General Chemistry 2</td>
</tr>
<tr>
<td>&amp; CHEM 162-0</td>
<td>and Accelerated General Chemistry Laboratory 2</td>
</tr>
<tr>
<td>or CHEM 171-0</td>
<td>Advanced General Inorganic Chemistry</td>
</tr>
<tr>
<td>&amp; CHEM 181-0</td>
<td>and Advanced General Inorganic Chemistry 2</td>
</tr>
<tr>
<td>&amp; CHEM 172-0</td>
<td>Laboratory</td>
</tr>
<tr>
<td>&amp; CHEM 182-0</td>
<td>and Advanced General Physical Chemistry Laboratory</td>
</tr>
</tbody>
</table>

5 Additional Related Math and Science Courses

Students must take 5 courses (and their associated lab, if applicable) from the following options, with at least 2 from the same group. Required labs do not count toward the 5-course total; however, if all three biological sciences labs are taken, they can collectively count toward one of the 5 required courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL_SCI 201-0</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>BIOL_SCI 202-0</td>
<td>Cell Biology (with required lab BIOL_SCI 232-0)</td>
</tr>
<tr>
<td>BIOL_SCI 203-0</td>
<td>Genetics and Evolution (with required lab BIOL_SCI 233-0)</td>
</tr>
<tr>
<td>BIOL_SCI 232-0</td>
<td>Molecular and Cellular Processes Laboratory</td>
</tr>
<tr>
<td>&amp; BIOL_SCI 233-0</td>
<td>and Genetics and Molecular Processes Laboratory</td>
</tr>
<tr>
<td>&amp; BIOL_SCI 234-0</td>
<td>and Investigative Laboratory</td>
</tr>
<tr>
<td>CHEM 210-1</td>
<td>Organic Chemistry</td>
</tr>
<tr>
<td>CHEM 210-2</td>
<td>Organic Chemistry</td>
</tr>
<tr>
<td>&amp; CHEM 230-2</td>
<td>and Organic Chemistry Lab I</td>
</tr>
<tr>
<td>ECON 201-0</td>
<td>Introduction to Macroeconomics</td>
</tr>
<tr>
<td>ECON 202-0</td>
<td>Introduction to Microeconomics</td>
</tr>
<tr>
<td>MATH 230-1</td>
<td>Multivariable Differential Calculus</td>
</tr>
<tr>
<td>MATH 240-0</td>
<td>Linear Algebra (Pre-requisite: MATH 230-1)</td>
</tr>
<tr>
<td>MATH 250-0</td>
<td>Elementary Differential Equations (Pre-requisites: MATH 226-0, MATH 230-2 and MATH 240-0)</td>
</tr>
<tr>
<td>PHYSICS 135-1</td>
<td>General Physics</td>
</tr>
<tr>
<td>&amp; PHYSICS 136-1</td>
<td>and General Physics Laboratory</td>
</tr>
<tr>
<td>PHYSICS 135-2</td>
<td>General Physics</td>
</tr>
<tr>
<td>&amp; PHYSICS 136-2</td>
<td>and General Physics Laboratory</td>
</tr>
<tr>
<td>PHYSICS 135-3</td>
<td>General Physics</td>
</tr>
<tr>
<td>&amp; PHYSICS 136-3</td>
<td>and General Physics Laboratory</td>
</tr>
</tbody>
</table>
### Advanced Studies Course Lists

Approved courses for the advanced studies course requirements (p. 1) may be selected from the below Science List (p. 2) and Environment and Society List (p. 2), dependent on track requirements outlined above.

#### Science List

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTHRO 306-0</td>
<td>Evolution of Life Histories</td>
</tr>
<tr>
<td>ANTHRO 312-0</td>
<td>Human Population Biology</td>
</tr>
<tr>
<td>ANTHRO 314-0</td>
<td>Human Growth &amp; Development</td>
</tr>
<tr>
<td>ANTHRO 390-0</td>
<td>Topics in Anthropology 1</td>
</tr>
<tr>
<td>BIOL_SCI 301-0</td>
<td>Principles of Biochemistry</td>
</tr>
<tr>
<td>BIOL_SCI 332-0</td>
<td>Conservation Genetics</td>
</tr>
<tr>
<td>BIOL_SCI 334-0</td>
<td>Soils and the Environment: The Earth's Critical Zone</td>
</tr>
<tr>
<td>BIOL_SCI 336-0</td>
<td>Spring Flora</td>
</tr>
<tr>
<td>BIOL_SCI 337-0</td>
<td>Biostatistics</td>
</tr>
<tr>
<td>BIOL_SCI 339-0</td>
<td>Critical Topics in Ecology and Conservation</td>
</tr>
<tr>
<td>BIOL_SCI 341-0</td>
<td>Population Genetics</td>
</tr>
<tr>
<td>BIOL_SCI 346-0</td>
<td>Field Ecology</td>
</tr>
<tr>
<td>BIOL_SCI 347-0</td>
<td>Conservation Biology</td>
</tr>
<tr>
<td>BIOL_SCI 349-0</td>
<td>Community Ecology</td>
</tr>
<tr>
<td>BIOL_SCI 350-0</td>
<td>Plant Evolution and Diversity Lab</td>
</tr>
<tr>
<td>CHEM 306-0</td>
<td>Environmental Chemistry</td>
</tr>
<tr>
<td>CHEM 329-0</td>
<td>Analytical Chemistry</td>
</tr>
<tr>
<td>CHEM 342-1</td>
<td>Thermodynamics</td>
</tr>
<tr>
<td>CHEM 342-2</td>
<td>Quantum Mechanics and Spectroscopy</td>
</tr>
<tr>
<td>CHEM 393-0</td>
<td>Green Chemistry</td>
</tr>
<tr>
<td>CHEM_ENG 345-0</td>
<td>Process Optimization for Energy and Sustainability</td>
</tr>
<tr>
<td>CHEM_ENG 365-0</td>
<td>Sustainability, Technology, and Society</td>
</tr>
<tr>
<td>CIV_ENV 260-0</td>
<td>Environmental Systems and Processes</td>
</tr>
<tr>
<td>CIV_ENV 340-0</td>
<td>Hydraulics and Hydrology</td>
</tr>
<tr>
<td>CIV_ENV 358-0</td>
<td>Airphoto Interpretation</td>
</tr>
<tr>
<td>CIV_ENV 361-1</td>
<td>Environmental Microbiology</td>
</tr>
<tr>
<td>CIV_ENV 361-2</td>
<td>Public &amp; Environmental Health</td>
</tr>
<tr>
<td>CIV_ENV 363-0</td>
<td>Environmental Engineering Applications 1: Air and Land</td>
</tr>
<tr>
<td>CIV_ENV 364-0</td>
<td>Sustainable Water Systems</td>
</tr>
<tr>
<td>CIV_ENV 365-0</td>
<td>Environmental Laboratory</td>
</tr>
<tr>
<td>CIV_ENV 367-0</td>
<td>Chemical Processes in Aquatic Systems</td>
</tr>
<tr>
<td>CIV_ENV 370-0</td>
<td>Emerging Organic Contaminants</td>
</tr>
<tr>
<td>CIV_ENV 371-0</td>
<td>Introduction to Transportation Planning and Analysis</td>
</tr>
<tr>
<td>CIV_ENV 376-0</td>
<td>Transportation System Operations</td>
</tr>
<tr>
<td>EARTH 201-0</td>
<td>Earth Systems Revealed</td>
</tr>
<tr>
<td>EARTH 300-0</td>
<td>Earth and Planetary Materials</td>
</tr>
<tr>
<td>EARTH 301-0</td>
<td>Petrology. Evolution of Crustal and Mantle Rocks</td>
</tr>
<tr>
<td>EARTH 310-0</td>
<td>Aqueous Geochemistry</td>
</tr>
<tr>
<td>EARTH 312-0</td>
<td>Stable Isotope Geochemistry</td>
</tr>
<tr>
<td>EARTH 313-0</td>
<td>Radiogenic Isotope Geochemistry</td>
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<tr>
<td>EARTH 314-0</td>
<td>Organic Geochemistry</td>
</tr>
<tr>
<td>EARTH 330-0</td>
<td>Sedimentary Geology</td>
</tr>
<tr>
<td>EARTH 331-0</td>
<td>Field Problems in Sedimentary Geology</td>
</tr>
<tr>
<td>EARTH 340-0</td>
<td>Physics of Weather &amp; Climate</td>
</tr>
<tr>
<td>EARTH 341-0</td>
<td>Quaternary Climate Change: Ice Ages to the Age of Oil</td>
</tr>
<tr>
<td>EARTH 342-0</td>
<td>Contemporary Energy and Climate Change</td>
</tr>
<tr>
<td>EARTH 343-0</td>
<td>Earth System Modeling</td>
</tr>
<tr>
<td>EARTH 353-0</td>
<td>Mathematical Inverse Methods in Earth and Environmental Sciences</td>
</tr>
<tr>
<td>EARTH 360-0</td>
<td>Instrumentation and Field Methods</td>
</tr>
<tr>
<td>EARTH 361-0</td>
<td>Scientific Programming in Python</td>
</tr>
<tr>
<td>EARTH 362-0</td>
<td>Data Analysis for Earth and Planetary Sciences</td>
</tr>
<tr>
<td>EARTH 370-0</td>
<td>Geobiology</td>
</tr>
<tr>
<td>EARTH 371-0</td>
<td>Biogeochemistry</td>
</tr>
<tr>
<td>EARTH 373-0</td>
<td>Microbial Ecology</td>
</tr>
<tr>
<td>EARTH 390-0</td>
<td>Special Topics in Earth and Planetary Science 1</td>
</tr>
<tr>
<td>ENV_RSCI 390-0</td>
<td>Special Topics in Environmental Sciences</td>
</tr>
<tr>
<td>GEOG 211-0</td>
<td>World Biogeography</td>
</tr>
<tr>
<td>GEOG 313-0</td>
<td>North America</td>
</tr>
<tr>
<td>GEOG 341-0</td>
<td>Principles of Cartography</td>
</tr>
<tr>
<td>ISEN 210-0</td>
<td>Introduction to Sustainability: Challenges and Solutions</td>
</tr>
<tr>
<td>ISEN 220-0</td>
<td>Introduction to Energy Systems for the 21st Century</td>
</tr>
<tr>
<td>MECH_ENG 241-0</td>
<td>Fluid Mechanics 1</td>
</tr>
<tr>
<td>MECH_ENG 395-0</td>
<td>Special Topics in Mechanical Engineering 1</td>
</tr>
</tbody>
</table>

1 Approved sections only.

#### Environment and Society List

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTHRO 383-0</td>
<td>Environmental Anthropology</td>
</tr>
<tr>
<td>ANTHRO 390-0</td>
<td>Topics In Anthropology 1</td>
</tr>
<tr>
<td>CIV_ENV 303-0</td>
<td>Environmental Law and Policy</td>
</tr>
<tr>
<td>CIV_ENV 349-0</td>
<td>Environmental Management</td>
</tr>
<tr>
<td>CIV_ENV 368-0</td>
<td>Sustainability: The City</td>
</tr>
<tr>
<td>CIV_ENV 395-0</td>
<td>Special Topics in Civil and Environmental Engr 3</td>
</tr>
<tr>
<td>ECON 281-0</td>
<td>Introduction to Applied Econometrics</td>
</tr>
<tr>
<td>ECON 310-1</td>
<td>Microeconomics</td>
</tr>
<tr>
<td>ECON 371-0</td>
<td>Economics of Energy</td>
</tr>
<tr>
<td>ECON 372-0</td>
<td>Environmental Economics</td>
</tr>
<tr>
<td>ECON 373-0</td>
<td>Natural Resource Economics</td>
</tr>
<tr>
<td>ENVR_POL 211-0</td>
<td>Food and Society: An Introduction</td>
</tr>
<tr>
<td>ENVR_POL 212-0</td>
<td>Environment and Society</td>
</tr>
<tr>
<td>ENVR_POL 261-0</td>
<td>American Religion, Ecology and Culture</td>
</tr>
<tr>
<td>ENVR_POL 309-0</td>
<td>American Environmental History</td>
</tr>
<tr>
<td>ENVR_POL 311-0</td>
<td>Food, Politics and Society</td>
</tr>
<tr>
<td>ENVR_POL 312-0</td>
<td>Social Change and the Environment</td>
</tr>
<tr>
<td>ENVR_POL 336-0</td>
<td>The Climate Crisis, Policies, and Society</td>
</tr>
<tr>
<td>ENVR_POL 340-0</td>
<td>Global Environments and World History</td>
</tr>
<tr>
<td>ENVR_POL 356-0</td>
<td>Native Americans and Environmental Decision Making</td>
</tr>
<tr>
<td>ENVR_POL 390-0</td>
<td>Special Topics in Environmental Policy and Culture</td>
</tr>
<tr>
<td>ENVR_POL 395-0</td>
<td>Special Topics Seminar 1</td>
</tr>
<tr>
<td>GEOG 240-0</td>
<td>Economic Geography</td>
</tr>
<tr>
<td>GEOG 328-0</td>
<td>The Human Use of the Earth</td>
</tr>
<tr>
<td>GBL_HLTH 302-0</td>
<td>Global Bioethics</td>
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<tr>
<td>HISTORY 200-0</td>
<td>New Introductory Courses in History 1</td>
</tr>
<tr>
<td>HISTORY 300-0</td>
<td>New Lectures in History 1</td>
</tr>
<tr>
<td>HISTORY 309-0</td>
<td>American Environmental History</td>
</tr>
<tr>
<td>HISTORY 376-0</td>
<td>Global Environments and World History</td>
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<tr>
<td>HISTORY 392-0</td>
<td>Topics In History 1</td>
</tr>
<tr>
<td>HISTORY 395-0</td>
<td>Research Seminar 1</td>
</tr>
</tbody>
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1 Approved sections only.
ISEN 230-0 Climate Change and Sustainability: Ethical Dimensions
ISEN 390-0 Special Topics in Energy & Sustainability
PHIL 254-0 Introduction to Philosophy of the Natural Sciences
PHIL 262-0 Ethical Problems and Public Issues
PHIL 268-0 Ethics and the Environment
PHIL 269-0 Bioethics
PHIL 270-0 Climate Change and Sustainability: Economic and Ethical Dimensions
PHIL 390-0 Special Topics In Philosophy 1
POLI_SCI 329-0 U.S. Environmental Politics
POLI_SCI 349-0 International Environmental Politics
RELIGION 261-0 American Religion, Ecology and Culture
SOCIOL 212-0 Environment and Society
SOCIOL 276-0 Introductory Topics in Sociology 1
SOCIOL 305-0 Population Dynamics
SOCIOL 311-0 Food, Politics and Society
SOCIOL 312-0 Social Change and the Environment

1 Approved sections only.

Honors in Environmental Sciences

Students with strong academic records and an interest in pursuing honors should approach a faculty member by the end of junior year to discuss possible projects; these may involve field, experimental, or computational research. Research is completed during a minimum 2 quarters of ENVR_SCI 399-0 Independent Study, which may count toward major requirements. Students then prepare a written thesis. Those whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (https://catalogs.northwestern.edu/undergraduate/arts-sciences/#academicoptionstext).