ENVIRONMENTAL SCIENCES MAJOR

The major in environmental sciences has two tracks: one in science and one in economic policy. The tracks share foundation courses in science and math and the core curriculum. Advanced coursework differs by track.

Students should plan their academic paths with an environmental sciences adviser soon after identifying their interests in the major. Foundation courses, many of which are prerequisites for advanced courses, should be completed as soon as possible. Students are encouraged (but not required) to take MATH 230-0 Differential Calculus of Multivariable Functions or the General Physics sequence PHYSICS 135-1, PHYSICS 135-2, PHYSICS 135-3, especially if they envision graduate training. Premedical students and students interested in advanced study in environmental biology are advised to take the full 200-level sequence in biological sciences and 2 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.

Course | Title
--- | ---
**Program Courses (11 units)**
3 core courses:
ENVR_SCI 201-0 | Earth: A Habitable Planet
ENVR_SCI 202-0 | The Health of the Biosphere
ENVR_SCI 203-0 | Humans and the Environment
8 advanced studies courses (see below) (p. 1)

**Foundations in Science and Math (Units depend on chemistry and mathematics sequences taken; courses may double-count with another major or a minor)**

Students should complete all of the following courses in their first two years:

MATH 220-0 | Differential Calculus of One-Variable Functions
&MATH 224-0 | and Integral Calculus of One-Variable Functions
or MATH 212-0 | Single Variable Calculus I
&MATH 213-0 | and Single Variable Calculus II
&MATH 214-0 | and Single Variable Calculus III
CHEM 110-0 | Quantitative Problem Solving in Chemistry
&CHEM 131-0 | and General Chemistry 1
&CHEM 141-0 | and General Chemistry Laboratory 1
&CHEM 132-0 | and General Chemistry 2
&CHEM 142-0 | and General Chemistry Laboratory 2
or CHEM 151-0 | Accelerated General Chemistry 1
&CHEM 161-0 | and Accelerated General Chemistry Laboratory 1
&CHEM 152-0 | and Accelerated General Chemistry 2
&CHEM 162-0 | and Accelerated General Chemistry Laboratory 2
or CHEM 171-0 | Advanced General Inorganic Chemistry
&CHEM 181-0 | and Advanced General Inorganic Chemistry
&CHEM 172-0 | Laboratory
&CHEM 182-0 | and Advanced General Physical Chemistry
and Advanced General Physical Chemistry Laboratory
5 courses chosen from the following, with at least 2 from the same group. (Chemistry and physics labs do not count toward the 5-course total.)

BIOL_SCI 215-0 | Genetics and Molecular Biology
BIOL_SCI 217-0 | Physiology
BIOL_SCI 219-0 | Cell Biology
BIOL_SCI 220-0 | Genetics and Molecular Processes Laboratory
&BIOL_SCI 221-0 | and Cellular Processes Laboratory
&BIOL_SCI 222-0 | and Investigative Laboratory

Advanced Studies Courses

See below for lists of approved science courses (p. 1) and environment and society courses (p. 2). See Environmental Sciences webpage (https://www.envsci.northwestern.edu/undergraduate/major-requirements.html) for updates to these lists.

- At least 6 must be at the 300 level.
- Students in the science track choose 6 from the science list and 2 from the environment and society list.
- Students in the policy track take:

Course | Title
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ECON 281-0 | Introduction to Applied Econometrics
ECON 310-1 | Microeconomics
ECON 371-0 | Economics of Energy
or ECON 372-0 | Environmental Economics
or ECON 373-0 | Natural Resource Economics

5 additional courses, including 4 from the science list

• Up to 2 ENVR_SCI 399-0 Independent Study research courses may be substituted for courses on the science list.
• Students who wish to double-major in Economics and Environmental Sciences are encouraged to do the science track in Environmental Science. Students doing the policy track must take extra 300-level economics classes to fulfill the requirements for both majors.

Science List

Course | Title
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ANTHRO 306-0 | Evolution of Life Histories
ANTHRO 312-0 | Human Population Biology
ANTHRO 314-0 | Human Growth & Development
ANTHRO 390-0 | Topics in Anthropology
BIOL_SCI 301-0 | Principles of Biochemistry
BIOL_SCI 330-0 | Plant Biology
BIOL_SCI 332-0 | Conservation Genetics
BIOL_SCI 334-0 | Soils and the Environment: The Earth’s Critical Zone
BIOL_SCI 336-0 | Spring Flora
BIOL_SCI 337-0 | Quantitative Methods for Ecology and Conservation

1 The lab courses BIOL_SCI 220-0 Genetics and Molecular Processes Laboratory, BIOL_SCI 221-0 Cellular Processes Laboratory, BIOL_SCI 222-0 Investigative Laboratory may together count as 1 course toward this requirement
BiOL_SCI 341-0  Population Genetics
BiOL_SCI 346-0  Field Ecology
BiOL_SCI 347-0  Conservation Biology
BiOL_SCI 349-0  Plant Community Ecology
BiOL_SCI 350-0  Plant Evolution and Diversity Lab
CHEM 306-0  Environmental Chemistry
CHEM 329-0  Analytical Chemistry
CHEM 342-1  Thermodynamics
CHEM 342-2  Quantum Mechanics and Spectroscopy
CHEM 393-0  Green Chemistry
CHEM_ENG 365-0  Sustainability, Technology, and Society
CIV_ENV 260-0  Environmental Systems and Processes
CIV_ENV 340-0  Hydraulics and Hydrology
CIV_ENV 358-0  Airphoto Interpretation
CIV_ENV 361-1  Environmental Microbiology
CIV_ENV 361-2  Public & Environmental Health
CIV_ENV 363-0  Environmental Engineering Applications 1: Air and Land
CIV_ENV 364-0  Sustainable Water Systems
CIV_ENV 365-0  Environmental Laboratory
CIV_ENV 367-0  Chemical Processes in Aquatic Systems
CIV_ENV 371-0  Introduction to Transportation Planning and Analysis
CIV_ENV 376-0  Transportation System Operations
EARTH 201-0  Earth Systems Revealed
EARTH 300-0  Earth and Planetary Materials
EARTH 301-0  Petrology: Evolution of Crustal and Mantle Rocks
EARTH 310-0  Aqueous Geochemistry
EARTH 312-0  Stable Isotope Geochemistry
EARTH 313-0  Radiogenic Isotope Geochemistry
EARTH 314-0  Organic Geochemistry
EARTH 330-0  Sedimentary Geology
EARTH 331-0  Field Problems in Sedimentary Geology
EARTH 341-0  Quaternary Climate Change: Ice Ages to the Age of Oil
EARTH 342-0  Contemporary Energy and Climate Change
EARTH 343-0  Earth System Modeling
EARTH 353-0  Mathematical Inverse Methods in Earth and Environmental Sciences (formerly Earth 329)
EARTH 360-0  Instrumentation and Field Methods
EARTH 361-0  Introduction to Scientific Programming in Python (formerly Earth 322)
EARTH 362-0  Data Analysis for Earth and Planetary Sciences (formerly Earth 326)
EARTH 371-0  Biogeochemistry (formerly Earth 317)
EARTH 373-0  Microbial Ecology
EARTH 380-0  Forming a Habitable Planet (formerly Earth 351)
EARTH 390-0  Special Topics in Earth and Planetary Science
ENVR_SI 390-0  Special Topics in Environmental Sciences
GEOG 211-0  World Biogeography
GEOG 240-0  Economic Geography
GEOG 341-0  Principles of Cartography
GEOG 343-0  Geographic Information Systems
ISEN 210-0  Introduction to Sustainability: Challenges and Solutions
ISEN 220-0  Introduction to Energy Systems for the 21st Century
MECH_ENG 241-0  Fluid Mechanics I
MECH_ENG 395-0  Special Topics in Mechanical Engineering

Approved sections only.

Environment and Society List

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<td>ANTHRO 383-0</td>
<td>Environmental Anthropology</td>
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<td>CIV_ENV 303-0</td>
<td>Environmental Law and Policy</td>
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<td>CIV_ENV 349-0</td>
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<td>CIV_ENV 368-0</td>
<td>Sustainability: The City</td>
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<td>CIV_ENV 395-0</td>
<td>Special Topics in Civil and Environmental Energy</td>
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<td>ECON 371-0</td>
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<td>HISTORY 200-0</td>
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<td>ISEN 230-0</td>
<td>Climate Change and Sustainability: Ethical Dimensions</td>
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<td>ISEN 390-0</td>
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<td>PHIL 254-0</td>
<td>Introduction to Philosophy of the Natural Sciences</td>
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<td>PHIL 268-0</td>
<td>Ethics and the Environment</td>
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<td>PHIL 269-0</td>
<td>Bioethics</td>
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<td>PHIL 270-0</td>
<td>Climate Change and Sustainability: Economic and Ethical Dimensions</td>
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<td>POLL_SI 329-0</td>
<td>U.S. Environmental Politics</td>
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<td>POLL_SI 349-0</td>
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<td>RELIGION 261-0</td>
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<td>SOCIOL 212-0</td>
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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 2 quarters of ENVR_SI 390-0 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).