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 230-1 Multivariable Differential Calculus 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 220-1 Single-Variable Differential Calculus
or MATH 218-1
& MATH 218-2
MATH 220-2 Single-Variable Integral Calculus
or MATH 218-3
& MATH 218-2
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
& CHEM 151-0 (or CHEM 151-0)
& CHEM 152-0 and Accelerated General Chemistry Laboratory 2
& CHEM 152-0 and Accelerated General Chemistry Laboratory 1
& CHEM 152-0 and Accelerated General Chemistry Laboratory 1
& CHEM 152-0 and Accelerated General Chemistry Laboratory 2
& CHEM 171-0 Advanced General Inorganic Chemistry
& CHEM 181-0 and Advanced General Inorganic Chemistry
& CHEM 181-0 Laboratory
& CHEM 182-0 and Advanced General Physical Chemistry
& CHEM 182-0 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

CHEM 210-1 Organic Chemistry
CHEM 210-2 Organic Chemistry
& CHEM 230-2 and Organic Chemistry Lab I
ECON 201-0 Introduction to Macroeconomics
ECON 202-0 Introduction to Microeconomics
PHYSICS 135-1 General Physics
& PHYSICS 136-1 and General Physics Laboratory
PHYSICS 135-2 General Physics
& PHYSICS 136-2 and General Physics Laboratory
PHYSICS 135-3 General Physics
& PHYSICS 136-3 and General Physics Laboratory
STAT 210-0 Introductory Statistics for the Social Sciences
MATH 230-1 Multivariable Differential Calculus
MATH 240-0 Linear Algebra (Pre-requisite: MATH 230-1)
MATH 250-0 Elementary Differential Equations (Pre-requisites: MATH 226-0, MATH 230-2 and MATH 240-0)

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

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

Course

Title

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 390-0 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

Course

Title

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 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
Environmental Sciences Major

Special Topics in Mechanical Engineering
Introduction to Energy Systems for the 21st Century
Solutions
Introduction to Sustainability: Challenges and Geographic Information Systems
Principles of Cartography
Economic Geography
World Biogeography
Forming a Habitable Planet (formerly Earth 351)
Microbial Ecology
Biogeochemistry (formerly Earth 317)
Scientific Programming in Python (formerly Earth 322)
Field Problems in Sedimentary Geology
Sedimentary Geology
Organic Geochemistry
Radiogenic Isotope Geochemistry
Stable Isotope Geochemistry
Aqueous Geochemistry
Petrology: Evolution of Crustal and Mantle Rocks
Earth and Planetary Materials
Petroleum Evolution and Diversity Lab
Plant Evolution and Diversity Lab
Plant Community Ecology
Community Ecology
Plant Community Ecology
Environmental Chemistry
Analytical Chemistry
Thermodynamics
Quantum Mechanics and Spectroscopy
Green Chemistry
Sustainability, Technology, and Society
Environmental Systems and Processes
Hydraulics and Hydrology
Airphoto Interpretation
Environmental Microbiology
Public & Environmental Health
Environmental Engineering Applications 1: Air and Land
Sustainable Water Systems
Environmental Laboratory
Chemical Processes in Aquatic Systems
Introduction to Transportation Planning and Analysis
Transportation System Operations
Earth Systems Revealed
Earth and Planetary Materials
Petroleum: Evolution of Crustal and Mantle Rocks
Aqueous Geochemistry
Stable Isotope Geochemistry
Radiogenic Isotope Geochemistry
Organic Geochemistry
Sedimentary Geology
Field Problems in Sedimentary Geology
Quaternary Climate Change: Ice Ages to the Age of Oil
Contemporary Energy and Climate Change
Earth System Modeling
Mathematical Inverse Methods in Earth and Environmental Sciences (formerly Earth 329)
Instrumentation and Field Methods
Scientific Programming in Python (formerly Earth 322)
Data Analysis for Earth and Planetary Sciences (formerly Earth 326)
Biogeochemistry (formerly Earth 317)
Microbial Ecology
Forming a Habitable Planet (formerly Earth 351)
Special Topics in Earth and Planetary Science
Special Topics in Environmental Sciences
World Biogeography
Economic Geography
Principles of Cartography
Geographic Information Systems
Introduction to Sustainability: Challenges and Solutions
Introduction to Energy Systems for the 21st Century
Fluid Mechanics I
Special Topics in Mechanical Engineering

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_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).