

ENVIRONMENTAL SCIENCES, MINOR

The environmental sciences minor has been developed to encourage and facilitate studies in environmental sciences by students completing degrees in the other science and engineering disciplines. The environmental sciences (ES) minor requires:

- set of mathematics and basic sciences courses
- two introductory courses dealing with the environment
- three upper-level environmental sciences courses

PAIRING MAJOR WITH THE ES MINOR

Many of the most creative and productive advances in environmental sciences in recent years have come from scientists trained in traditional disciplines (biology, chemistry, geology, physics, and engineering) who have devoted themselves to the study of environmental problems. Completion of the degree requirements of a traditional discipline provides depth and rigor that, when supplemented with additional academic training in environmental science, can be applied to professional work in a variety of environmental subjects. A faculty advisor is assigned to each student in the environmental sciences minor program to assist in planning their academic program and to approve the choice of courses to satisfy the minor. Faculty advisors are available in the following areas:

Biological Processes

Response of ecosystems to change, microbial degradation of pollutants, biogeochemical cycling of greenhouse gases. **Illustrative majors:** Biology, Biomedical Engineering, Biophysics, Biochemical Engineering.

Faculty advisor: Sarah Preheim

Physical Processes

Erosion of hillslopes, rivers, and coastlines; sediment production, transport, and fate; groundwater, movement of contaminant plumes; oceanography; atmospheric physics; aerosol formation; global warming. **Illustrative majors:** Civil Engineering, Chemical and Biomolecular Engineering, Mechanical Engineering, Physics, Earth and Planetary Sciences.

Faculty advisor: Ciaran Harman

Environmental Chemistry

Environmental fate of pollutants, water, and wastewater treatment, geochemistry, atmospheric chemistry, ozone depletion, acid rain. **Illustrative majors:** Chemistry, Chemical and Biomolecular Engineering, Earth and Planetary Sciences, Materials Science and Engineering.

Faculty advisor: Alan Stone

Environmental Systems

Environmental modeling, risk assessment, environmental systems design, and pollution control strategies. **Illustrative majors:** Civil Engineering and Applied Mathematics and Statistics.

Faculty advisor: Ben Hobbs

The information below describes the academic requirements for students entering JHU as degree-seeking students in Fall 2025. Students who

entered JHU as degree-seeking students prior to Fall 2025 should view the appropriate archived catalogue (<https://e-catalogue.jhu.edu/archive/>).

The minor in Environmental Studies requires 5 courses and at least 14 credits aside from the required Mathematics and Basic Sciences courses. Grades of C- or higher are required for all courses. No Satisfactory/Unsatisfactory (S/U) grade will be accepted.

MINOR REQUIREMENTS

MATHEMATICS

Code	Title	Credits
AS.110.108	Calculus I (Physical Sciences & Engineering)	4
AS.110.109	Calculus II (For Physical Sciences and Engineering)	4
One additional math course from the following:		4
AS.110.201	Linear Algebra	
or AS.110.21 Honors Linear Algebra		
AS.110.202	Calculus III	
or AS.110.21 Honors Multivariable Calculus		
AS.110.302	Differential Equations and Applications	
EN.553.291	Linear Algebra and Differential Equations	
Total Credits		12

BASIC SCIENCES

Code	Title	Credits
AS.020.151	General Biology I ¹	3
or EN.570.201 Environmental Biology and Ecology		
AS.030.101	Introductory Chemistry I	3
AS.030.102	Introductory Chemistry II ²	3
AS.030.105	Introductory Chemistry Laboratory I	1
AS.030.106	Introductory Chemistry Laboratory II ²	1
AS.030.205	Introductory Organic Chemistry I	4
AS.171.101	General Physics: Physical Science Major I	4
or AS.171.107 General Physics for Physical Sciences Majors (AL)		
AS.173.111	General Physics Laboratory I	1
Total Credits		20

¹ Additional Biology course accepted with an approval from the department.

² Students who have exam credits for Chemistry I and the lab must take AS.030.103 Applied Chemical Equilibrium and Reactivity w/ lab rather than AS.030.102 Introductory Chemistry II and AS.030.106 Introductory Chemistry Laboratory II.

INTRODUCTORY COURSES

Code	Title	Credits
Complete two courses from the following:		5-6
AS.270.220	The Dynamic Earth: An Introduction to Geology	
AS.270.221	The Dynamic Earth Laboratory	
EN.570.239	Environmental Engineering Chemistry - Current and Emerging Topics	
Total Credits		5-6

UPPER-LEVEL COURSES

Code	Title	Credits
Complete three courses from the following:		9-10
AS.270.302	Aqueous Geochemistry	3
AS.270.311	Geobiology	3
AS.270.350	Sedimentary Geology	4
EN.570.303	Environmental Engineering Principles and Applications	3
EN.570.350	Environmental Hazards and Health Risks	3
EN.570.353	Hydrology	3
EN.570.411	Engineering Microbiology	3
EN.570.415	Current Trends in Environmental Microbiology	3
EN.570.441	Environmental Inorganic Chemistry	3
EN.570.442	Environmental and Analytical Organic Chemistry	3
EN.570.443	Aquatic and Biofluid Chemistry	3
EN.570.445	Physical and Chemical Processes I	3
EN.570.491	Hazardous Waste Engineering and Management	3
EN.575.706	Biological Processes for Water & Wastewater Treatment	3
<i>Total Credits</i>		<i>9-10</i>