

ENVIRONMENTAL SCIENCE, BACHELOR OF SCIENCE

Environmental Science Major Requirements (B.S.)

(Also see Requirements for a Bachelor's Degree. (<https://e-catalogue.jhu.edu/ksas-wse/undergraduate-policies/academic-policies/requirements-bachelors-degree/>))

The Bachelor of Science in Environmental Science is an interdisciplinary major that introduces students to the ways in which human activities impact Earth systems and vice versa. It equips students to use a variety of tools, such as science, policy, communication, and individual and societal behavior change, to solve environmental and sustainability problems, with an emphasis on the perspectives and tools of the natural sciences. Environmental Science majors must complete a set of core courses common to both ENVS majors, including a senior capstone and an applied experience, plus several additional natural science core courses and a suite of electives in the student's area of interest.

All ENVS majors are encouraged to consider studying abroad at some point during their undergraduate years to develop a more global, culturally sensitive perspective on environmental and sustainability issues. Students are also encouraged to take advantage of the opportunities at JHU and elsewhere to engage in research and scholarship, either through a work or internship experience, an independent research course, or a senior thesis project.

The Environmental Science major requires a total of 67-72 credits to complete. With the exception of the Applied Experience, all courses must be taken for a letter grade, and students must earn a grade of C- or better to apply the course to the major. Students are not permitted to double-major in both Environmental Science and Environmental Studies.

Electives

Each student should work with their advisor to choose a coherent and meaningful suite of elective courses that are relevant to the student's individual interests and career plans and that total at least 15 credits, 12 of which are at the 300-level or above. Some students may choose to center their electives around one or more environmental/sustainability issues or disciplines, such as Earth science or ecology; others may choose to explore more broadly. Approved elective courses are those that concentrate directly on environmental or sustainability issues. ENVS independent study, independent research, and senior thesis courses can also count as electives. The ENVS Director of Undergraduate Studies (DUS) distributes a list of approved elective courses each semester, and these courses are denoted with the POS tag ENVS-MAJOR in the Schedule of Classes. Approval for other courses can be sought by emailing the DUS.

Applied Experience

The applied experience can be completed during any semester including summers and involves at least 80 hours of supervised, hands-on work while enrolled in AS.271.509 Applied Experience. The experience can involve doing research or working with an organization on environmental or sustainability issues through an internship or similar work or volunteer experience. Journal entries and synthesizing assignments reflecting on the experience are required for the course. The goal of this requirement is to ensure that students have practical experience in a workplace or

community setting that will help prepare them for the next step in their education and career.

Senior Capstone & Seminar

The ENVS AS.271.496 Senior Capstone course focuses on developing critical thinking and communication skills through engagement with complex, real world, environmental and sustainability problems. Concurrently, seniors take the 1-credit AS.271.499 Senior Seminar course that focuses on life design and career planning in order to support seniors as they transition to post-graduate life and work. All ENVS majors must enroll in the capstone and senior seminar courses in the fall semester of their senior year.

Writing and Communication in the Major

Students must complete at least 6 credits of Writing and Communication foundational ability coursework in one major. For this major, students would be able to fulfill this requirement by completing AS.271.107 Introduction to Sustainability, a required 3 credit course of the ENVS major, and by selecting one elective (at least 3 credits) for the major that is designated as a Writing and Communications course.

Major Requirements

Code	Title	Credits
Common ENVS Core		
AS.270.103	Introduction to Global Environmental Change	3
AS.271.107	Introduction to Sustainability	3
AS.270.202	Introduction to Ecology	3
AS.270.205	Introduction to Geographic Information Systems and Geospatial Analysis	3
AS.271.402	Water, Energy, and Food Nexus	3
AS.271.403	Environmental Policymaking and Policy Analysis	3
or AS.271.360	Climate Change: Science & Policy	
or EN.570.367	Sustainability Science and Policy: The Threat of Climate Change	
or EN.570.499	Pursuing Sustainability Policy: Knowledge to Action	
AS.271.496	Senior Capstone (Students taking the Honors path may replace the Capstone with the Senior Thesis.)	3
AS.271.499	Senior Seminar	1
AS.271.509	Applied Experience	1
AS.030.101	Introductory Chemistry I	3
AS.110.106	Calculus I (Biology and Social Sciences)	4
or AS.110.108	Calculus I (Physical Sciences & Engineering)	
AS.180.102	Elements of Microeconomics	3
AS.230.205	Introduction to Social Statistics	4
or AS.280.345	Public Health Biostatistics	
or EN.553.111	Statistical Analysis I	
or EN.553.211	Probability and Statistics for the Life Sciences	
or EN.553.310	Probability & Statistics for the Physical Sciences & Engineering	
or EN.553.311	Intermediate Probability and Statistics	
Natural Sciences Core		
AS.110.107	Calculus II (For Biological and Social Science)	4
or AS.110.109	Calculus II (For Physical Sciences and Engineering)	
or AS.110.113	Honors Single Variable Calculus	
AS.030.102	Introductory Chemistry II	3-4
or AS.030.103	Applied Chemical Equilibrium and Reactivity w/lab	

Select two of the following science courses: 6-8

AS.020.151	General Biology I
AS.020.152	General Biology II
AS.171.101	General Physics: Physical Science Major I or AS.171.106 General Physics I for Biological Science Majors or AS.171.106 Classical Mechanics I or AS.171.107 General Physics for Physical Sciences Majors (AL)
AS.171.102	General Physics: Physical Science Major II or AS.171.107 General Physics/Biology Majors II or AS.171.107 Electricity and Magnetism I or AS.171.107 General Physics for Physical Science Majors (AL)

Lab Experiences

3 approved science lab courses are required. Lab courses waived due to Advanced Placement Exam credit cannot count toward this requirement. Approved labs include but are not limited to: ¹ 2-4

AS.020.153	General Biology Laboratory I
AS.020.154	General Biology Lab II
AS.030.105	Introductory Chemistry Laboratory I
AS.030.106	Introductory Chemistry Laboratory II
AS.173.111	General Physics Laboratory I
AS.173.112	General Physics Laboratory II
AS.173.115	Classical Mechanics Laboratory
AS.173.116	Electricity and Magnetism Laboratory
AS.270.221	The Dynamic Earth Laboratory
AS.270.337	Freshwater Systems Lab
AS.270.338	Field Methods in Ecology (If used to satisfy the lab requirement, this course cannot count as an elective.)
AS.270.355	Forested Landscapes and Ecology Lab

Electives

Choose 15 credits of approved courses, at least 12 credits of which are at the 300-level or above. ENVS independent study, independent research, and senior thesis courses can count as electives. Courses with the POS-Tag ENVS-Major automatically apply towards this requirement. 15

Total Credits 67-72

¹ Students who earned a 4 on the AP Chemistry exam and took AS.030.103 Applied Chemical Equilibrium and Reactivity w/lab will have fulfilled one lab course requirement and will complete two additional labs from this list.

Sample Program of Study

First Year

First Semester	Credits	Second Semester	Credits
AS.270.103	3	AS.271.107	3
AS.030.101	3	AS.030.102	3
AS.110.108	4	AS.110.109	4
AS.270.220	3		
	13		10

Second Year

First Semester	Credits	Second Semester	Credits
AS.270.205	3	AS.270.202	3
AS.020.151	3	AS.020.152	3

AS.020.153	1	AS.020.154	1
EN.553.111	4	AS.180.102	3
	11		10

Third Year

First Semester	Credits	Second Semester	Credits
AS.271.402	3	AS.271.509	1
Elective course	3	Elective course	3
		Elective course	3
	6		7

Fourth Year

First Semester	Credits	Second Semester	Credits
AS.271.496	3	AS.271.403	3
AS.271.499	1	Elective course	3
Elective course	3		
	7		6

Total Credits 70

Honors in the Major

To earn honors in the major, a student must meet the following criteria:

- Earn a cumulative GPA of 3.50 in the courses taken to fulfill the major requirements.
- Complete AS.271.399 Research Design during the junior year to develop a senior thesis project proposal. If a student is prevented from taking the course for some reason, such as studying abroad, they must petition the DUS for a waiver.
- Submit a senior thesis project proposal on an environmental or sustainability-related research project or other comparable scholarly endeavor before the start of the senior year. It will be evaluated by the ENVS Director, Associate Director, and the proposed faculty research advisor and must meet their approval.
- Complete 6 credits of AS.271.511 Senior Honors Thesis under the guidance of a JHU faculty member or research affiliate.
- Earn a rating of good or excellent on the final product of the thesis, as determined by the ENVS thesis committee including the student's research advisor.
- Present the results of the thesis orally in an appropriate JHU department.

Additional details on the procedures and criteria for earning honors are available on the ENVS website. A thesis project completed to earn honors in an ENVS major cannot be double-counted with an honors thesis done in another department or program for a second major.

B.S./M.S. Option

Undergraduates majoring in Environmental Science may apply for accelerated status toward an M.S. in Environmental Sciences and Policy (ESP) or an M.S. in Geographic Information Systems (GIS) through the JHU Krieger School of Arts & Sciences' Advanced Academic Programs. Interested students should speak with their advisor and the Director of the ESP or GIS Program in their senior year. Students may apply up to three courses taken as undergraduates toward the M.S. in Environmental Science and Policy and up to two courses toward the M.S. in GIS, thereby leaving only seven to eight more courses to complete the M.S. following receipt of their bachelor's degree. Students will receive two separate degrees, so the requirements of both degrees must be fulfilled. Students

cannot earn the M.S. degree without completion of the B.A. or B.S., however, students who do not complete the M.S. retain their B.A. or B.S.