BACHELOR OF SCIENCE WITH A MAJOR IN ENVIRONMENTAL AND SUSTAINABILITY SCIENCE (STEM)

OVERVIEW

The bachelor of science in environmental and sustainability science program equips students with a broad foundation in the sciences with which they can take advantage of important new quantitative skills in geospatial techniques and data science and develop a concentration in either Earth and environmental science or ecological management. Required coursework incorporates science courses from across the university, with elective options including Conservation Biology, Water Resources, and Oceanography. Through varied courses, internships, and undergraduate research, students gain experience in one of the fastest-growing career fields.

Program graduates are well prepared for competitive careers in natural resource management; environmental consulting and startups; sustainability planning and policy; and compliance-oriented agencies and departments of the environment at the local, state, and federal levels. The program is also beneficial for students planning to attend graduate programs in environmental science, ecological management, or sustainability planning and policy.

This is a STEM designated program.

ADMISSIONS

For information about the admission process, including deadlines, visit the Office of Undergraduate Admissions website (https://undergraduate.admissions.gwu.edu/). Applications can be submitted via the Common Application (https://go.gwu.edu/commonapp/).

Supporting documents not submitted online should be mailed to:

Office of Undergraduate Admissions
The George Washington University
800 21st St NW Suite 100
Washington, DC 20052

For questions visit undergraduate.admissions.gwu.edu/contact-us (http://undergraduate.admissions.gwu.edu/contact-us/).

REQUIREMENTS

Code	Title	Credits
Required		
Foundational courses		
BISC 1111	Introductory Biology: Cells and Molecules	
BISC 1112	Introductory Biology: The Biology of Organisms	
GEOG 1002	Introduction to Physical Geography	
or GEOL 1005	Environmental Geology	
GEOG 1003	Society and Environment	
or SUST 1001	Introduction to Sustainability	
STAT 1051	Introduction to Business and Economic Statistics	
or STAT 1053	Introduction to Statistics in Social Science	
or STAT 1111	Business and Economic Statistics I	
or STAT 1127	Statistics for the Biological Sciences	
And two of the following sets of courses:		
CHEM 1111 & CHEM 1112	General Chemistry I and General Chemistry II	
MATH 1220 & MATH 1221	Calculus with Precalculus I and Calculus with Precalculus II	
or MATH 1231	Single-Variable Calculus I	
PHYS 1011 & PHYS 1012	General Physics I and General Physics II	
or PHYS 1021 & PHYS 1022	University Physics I and University Physics II	
or PHYS 1025 & PHYS 1026	University Physics I with Biological Applications and University Physics II with Biological Applications	
Upper-level major requirements		
Required courses		
GEOG 2104	Introduction to Cartography and GIS	
GEOG 2196	Field Methods in Geography *	
or GEOG 3128	Geomorphology and Natural Hazards	
or BISC 3459	Field Biology	
ENVR 4195	Environmental Studies Capstone	
Additional upper-level course requirements		
18 credits in courses in the major taken at or above the 2000 level. A minimum of 12 of these credits should be taken in one of the two concentrations outlined below and include at least one 3000-level course. The remaining 6 credits can be in courses selected from the other concentration or from the "Other upper level courses in the major" category below.		
Earth and environmental science concentration		
CHEM 2085	Environmental Chemistry	

CHEM 3140	Geochemistry
GEOG 2136	Water Resources
GEOG 3105	Techniques of Spatial Analysis
GEOG 3108	Weather and Climate
GEOG 3128	Geomorphology and Natural Hazards *
GEOG 3218	Arctic Systems
GEOL 2106	Oceanography
GEOL 2151	Introduction to Paleontology
GEOL 3138	Hydrogeology
GEOL 3191	Geology of Energy Resources
Ecological management concentration	
ANTH 3407	Conservation in a Changing World: Human and Animal Behavior
BISC 2333	Evolution and Extinction of Dinosaurs
BISC 2452	Animal Behavior
BISC 2010	Global Change Biology
BISC 2401	Biodiversity in a Changing World
BISC 2454	General Ecology
BISC 3454	Marine Ecology
BISC 3459	Field Biology *
BISC 3460W	Conservation Biology
or BISC 3460	Conservation Biology
BISC 3461	Plant-Animal Interactions
BISC 3464	Ecology and Evolution of Societies
GEOG 2129W	Biogeography
or GEOG 2129	Biogeography
GEOG 3132	Environmental Quality and Management
GEOG 3275	Sustainable Food Systems
Other upper-level courses in the major **	
ECON 2136	Environmental and Natural Resource Economics
GEOG 3105	Techniques of Spatial Analysis
GEOG 3106	Intermediate Geographic Information Systems
GEOG 3107	Introduction to Remote Sensing
GEOG 3193	Environmental Law and Policy
GEOG 4309	GIS for Emergency Management
PHIL 2281	Philosophy of the Environment
PPPA 2701	Sustainability and Environmental Policy
PUBH 3132	Health and Environment

*BISC 3459 and GEOG 3128 cannot be counted toward the concentration if they were taken to fulfill the upper-level major course requirement.

**These courses can be counted toward the total number of credits required for the major.

GENERAL EDUCATION

In addition to the University General Education Requirement (http://bulletin.gwu.edu/university-regulations/general-education/), undergraduate students in Columbian College must complete a further, College-specific general education curriculum —Perspective, Analysis, Communication (G-PAC) (https://advising.columbian.gwu.edu/general-education-curriculum-gpac/) as well as the course CCAS 1001 First-Year Experience. Together with the University General Education Requirement, G-PAC engages students in active intellectual inquiry across the liberal arts. Students achieve a set of learning outcomes that enhance their analytical skills, develop their communication competencies, and invite them to participate as responsible citizens who are attentive to issues of culture, diversity, and privilege.

Coursework (http://bulletin.gwu.edu/university-regulations/general-education/#generaleducationtext) for the University General Education Requirement is distributed as follows:

- One course in critical thinking in the humanities.
- Two courses in critical thinking, quantitative reasoning, or scientific reasoning in the social sciences.
- One course that has an approved oral communication component.
- One course in quantitative reasoning (must be in mathematics or statistics).
- One course in scientific reasoning (must be in natural and/or physical laboratory sciences).
- UW 1020 University Writing
- After successful completion of UW 1020, 6 credits distributed over at least two writing in the discipline (WID) courses taken in separate semesters. WID courses are designated by a "W" appended to the course number.

Coursework for the CCAS G-PAC requirement is distributed as follows:

- Arts—one approved arts course that involves the study or creation of artwork based on an understanding or interpretation of artistic traditions or knowledge of art in a contemporary context.
- Global or cross-cultural perspective—one approved course that analyzes the ways in which institutions, practices, and problems transcend national and regional boundaries.
- Local or civic engagement—one approved course that develops the values, ethics, disciplines, and commitment to pursue responsible public action.
- Natural or physical science—one additional approved laboratory course that employs the process of scientific inquiry (in addition to the one course in this category required by the University General Education Requirement).
- Humanities—one additional approved humanities course that involves critical thinking skills (in addition to the one course in this category required by the University General Education Requirement).
- CCAS 1001 First-Year Experience

Certain courses are approved to fulfill GPAC requirements in more than one category.

Courses taken in fulfillment of G-PAC requirements can also be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University can count toward the University General Education Requirement and G-PAC, if those transfer courses are equivalent to GW courses that have been approved by the University and the College.

Lists of approved courses in the above categories are included on each undergraduate major's (http://bulletin.gwu.edu/arts-sciences/#majorstext) page in this Bulletin.