

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

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Undergraduate Programs (<https://bulletin.gwu.edu/arts-sciences/#degreeregulationstext>).

The program-specific curriculum:

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	
Two of the following course sets:		
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 within one of the two concentrations below and include at least one 3000-level course. The remaining two courses can be 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 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

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 double counted as concentration courses if already used to fulfill the upper-level major requirement.

**May be used to fulfill the total number of required credits in the major.

GENERAL EDUCATION

In addition to the University General Education Requirement (<https://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://bulletin.gwu.edu/arts-sciences/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 (<https://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 (<https://bulletin.gwu.edu/search/?P=UW%201020>) University Writing (4 credits).
- 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 may also be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University may 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 (<https://bulletin.gwu.edu/arts-sciences/#majorstext>) page in this Bulletin.