ENVIRONMENTAL GEOLOGY

Degree: B.S., Environmental Science and Geology
Department of Earth and Environmental Sciences (https://cas.umw.edu/ees/)

Geology is the scientific study of the Earth, including its composition, dynamics, surface processes, and history. The environmental geology major (Bachelor of Science degree in Environmental Sciences and Geology) is designed for students with a specific interest in Earth's surficial processes, especially as they relate to human interaction with the landscape and environment. Environmental geology, therefore, examines topics such as hydrogeology, soil and water chemistry, and geomorphology that lie at the interfaces of the lithosphere, the hydrosphere, and climate system.

The Department has modern laboratories in the Jepson Science Center equipped with advanced analytical instruments to support classroom instruction and to provide opportunities for research. Equipment for ecological studies in terrestrial, fresh water, and marine environments includes live animal traps, plankton and insect nets, seines, dissolved oxygen, conductivity, and pH meters, and fresh and salt water aquaria. Major laboratory equipment includes petrographic microscopes, a magnetic susceptibility instrument, and dedicated lab facilities for paleontology, sedimentology, and geochemistry. The Jepson Science Center has a variable pressure scanning electron microscope with chemical capabilities that is shared by the science disciplines. For environmental and geological fieldwork, the department has GPS equipment, a small fleet of research boats (including one equipped for trawling, coring, and dredging), coring and surveying equipment, and for classroom study, an extensive collection of rocks, minerals, and fossils. The department also maintains a computer lab/classroom equipped with the latest Geographic Information Systems (GIS) software.

Majors in all of our programs are encouraged to do independent study and/or research during their senior year. Financial support for student research is available. Qualified students may also choose to do an internship with a professional organization during either their junior or senior year. Students with a 3.00 overall grade-point average and a 3.25 grade-point average in the major may pursue Honors in Environmental Science, Geology, or Environmental Geology by completing an independent research project and writing and defending a thesis.

All of our majors are encouraged to fulfill the general education experiential learning requirement by completing Undergraduate Research URES 197 Undergraduate Research, Earth and Environmental Science EESC 481 Readings, EESC 491 Individual Study, EESC 493 Honors Research, or EESC 499 Internship . Alternatively, majors may meet this requirement by participating in an approved supervised on-campus or off-campus summer research experience developed in consultation with the department (such as the UMW Summer Science Research Program or a similar program at another college or university). **To complete the Beyond The Classroom requirement through a summer research experience, contact the department chair for more details.**

Student Learning Outcomes

1. Students will demonstrate how different components of the Earth System interact.

2. Students will demonstrate the ability to examine a problem and develop a solution.

3. Students will demonstrate the ability to collect field and lab data.

4. Students will demonstrate the ability to process and interpret data sets.

5. Students will demonstrate the ability to effectively communicate in both oral and written formats.

Major Requirements

Code	Title	Credits
EESC 111	Our Dynamic Earth	4
EESC 112	Evolution of Earth	4
EESC 240	Field Methods in Environmental Science and Geology	4
EESC 301	Mineralogy	4
EESC 307	Environmental Soil Science	3
EESC 311	Sedimentation and Stratigraphy	4
EESC 315	Hydrogeology	4
EESC 412	Structural Geology	4
EESC 460	Senior Seminar	2
Select one of the following:		4
EESC 205	GIS Applications in Environmental Science and Geology with Lab	
GISC 200	Introduction to GIS	
GISC 250	Introduction to Geographic Information Systems and Cartography	
Select at least two courses from the Environmental Geology electives list, below (minimum of 6 credits):		6
Total Credits		**43**

Code	Title	Credits
EESC 121	Oceanography	4
EESC 302	Petrology	4
EESC 325	Environmental Geochemistry	4
EESC 330	Environmental Regulations	3
EESC 335	Plate Tectonics	4
EESC 340	Energy Resources and Technology	3
EESC 355	Icehouse-Greenhouse Earth	3
EESC 360	Environmental Exploration	2-4
EESC 421	Special Topics	2-4
EESC 465	Senior Portfolio and Career Preparation	1
EESC 481	Readings	1-2
EESC 491	Individual Study	1-4
EESC 493	Honors Research	4
EESC 499	Internship [1]	1-12

[1] A maximum of 3 credits may count toward the major requirements.

Prerequisite Courses

CHEM 111 General Chemistry I and CHEM 112 General Chemistry II are prerequisites to courses in the Environmental Geology major. Students expecting to major in a geology program should consider taking the introductory chemistry sequence as general education requirements or as electives.

General Education Requirements

The general education requirements for Bachelor of Arts/Bachelor of Science degrees (https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-arts-bachelor-science-degrees/) apply to all students who are seeking to earn an undergraduate B.A., B.S. or B.S.Ed. degree.

Students seeking a Bachelor of Liberal Studies degree have a separate set of BLS general education requirements (https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-liberal-studies-degrees/).

Electives

Elective courses are those that are not needed to fulfill a general education requirement or major program requirement but are chosen by the student to complete the 120 credits required for graduation with a B.A./B.S./B.S.Ed. degree or the BLS degree. These courses may be taken graded or pass/fail (or S/U in the case of physical education and 100-level dance). No student in a regular B.A./B.S./B.S.Ed. program may count more than 60 credits in a single discipline toward the 120 credits required for graduation.

Total Credits Required for the Degree: 120 credits

Plan of Study

This suggested plan of study should serve as a guide to assist students when planning their course selections. It is not a substitute for a student's Degree Evaluation or the Program Requirements listed for this major in the catalog. Academic planning is the student's responsibility, and course selections should be finalized only after speaking with an advisor. Students should familiarize themselves with the catalog in effect at the time they matriculated at the University of Mary Washington. Students should also familiarize themselves with general education requirements (https://catalog.umw.edu/undergraduate/general-education/) which can be fulfilled through general electives as well as major/minor course requirements. Course requirements and sequencing may vary with AP, IB, CLEP, Cambridge or previous coursework, transfer courses, or other conditions. To be considered full-time, an undergraduate student must be enrolled in 12 or more credits for the semester.

Course	Title	Credits
Freshman		
Fall		
CHEM 111	General Chemistry I	4
EESC 111	Our Dynamic Earth	4
FSEM 100	First-Year Seminar	3
General Education Courses		4
	Credits	**15**
Spring		
CHEM 112	General Chemistry II	4
EESC 112	Evolution of Earth	4
General Education Course		7
	Credits	**15**
Sophomore		
Fall		
EESC 240	Field Methods in Environmental Science and Geology	4
EESC 301	Mineralogy	4
General Education Courses		7
	Credits	**15**
Spring		
EESC Elective		3
General Education Courses or Electives		12
	Credits	**15**
Junior		
Fall		
EESC 205 or GISC 200 or GISC 250	GIS Applications in Environmental Science and Geology with Lab or Introduction to GIS or Introduction to Geographic Information Systems and Cartography	4
EESC 311	Sedimentation and Stratigraphy	4
EESC Elective		3
General Electives		4
	Credits	**15**
Spring		
EESC 307	Environmental Soil Science	3
General Electives		12
	Credits	**15**
Senior		
Fall		
EESC 315	Hydrogeology	4
EESC 465	Senior Portfolio and Career Preparation	1
General Electives		10
	Credits	**15**
Spring		
EESC 412	Structural Geology	4
EESC 460	Senior Seminar	2
General Electives		9
	Credits	**15**
	Total Credits	**120**

Note: The schedule outlined above assumes a student enters UMW planning to major in Geology or Environmental Geology, and that a student is eligible to take CHEM 111 General Chemistry I during fall of their first year. Students who are recommended to take the preparatory CHEM 101 Foundations of Chemistry should do so during the fall semester of their freshman year. CHEM 111 can then be taken during the spring semester of a student's freshman year and CHEM 112 General Chemistry II during fall of the sophomore year. Alternatively, a student may take the CHEM 111-112 sequence during their sophomore year.

EESC 205 (GISC Option), EESC 240, EESC 301, EESC 311, and EESC 315 are traditionally offered every fall semester. EESC 112, EESC 307, and EESC 460 are traditionally offered every spring semester. EESC 412 is traditionally offered in alternate spring semesters.

Earth and Environmental Sciences Faculty

Jodie L. Hayob, Chair
Jodie L. Hayob, Career Advisor (Geology)
Melanie D. Szulczewski, Career Advisor (Environmental Science)/ Program Director, (Environmental Sustainability Minor)

Professors

Jodie L. Hayob
Ben O. Kisila
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Associate Professors

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