

# ENVIRONMENTAL GEOSCIENCE, BACHELOR OF SCIENCE (BS) - CONCENTRATION IN ENVIRONMENTAL SCIENCE

Environmental science is the integration of scientific knowledge from many disciplines in order to understand the interrelationships between human activities and the environment. Environmental science majors are exposed to the general principles of biology, chemistry, geology, geography, meteorology, and physics. Thus, it is not a focus on one of these disciplines, but involves all of them and their interaction within environmental systems.

Environmental science majors could enter several general fields:

- Industry and Consulting, monitoring and investigating the contamination of the air, land and water. Responsibilities could range from working to reduce potential environmental contamination in an industrial setting, to remediating contamination that resulted from past disposal practices.
- Local, State, or Federal Environmental Agencies, working to monitor, enforce, and develop environmental policy and regulations.
- Environmental Research, working to understand and solve environmental problems. Students would continue their education in a graduate program focusing on an area of interest to them.

The program is rich in laboratory and field experiences that support our lecture classes. Students gain important practical experience working in the field studying environmental systems and problems. In addition, students are required to complete an approved internship or research project. We train our students not only with a liberal arts education and a broad-based scientific background, but with the skills that will enable them to succeed in a competitive work force. The department encourages undergraduate student research. Opportunities abound for students to work directly with the faculty on independent research projects.

ENVS 450 or ENVS 480 must be completed during the summer after your Junior or Senior year.

## Program Learning Outcomes

- **Outcome 1 (EGEO):** Each graduate shall develop general knowledge and understanding of the composition, history, and structure of the planet, and of the physical, chemical, and biological processes involved in the interactions between the geosphere, hydrosphere, atmosphere, and biosphere.
  - Each graduate will demonstrate an understanding of plate tectonic theory and be able to describe how it operates
  - Each graduate will demonstrate an understanding of the geologic time scale and the timing of major events in Earth history
  - Each graduate will demonstrate the ability to characterize and identify important rocks and minerals, and to interpret the processes by which they formed
  - Each graduate will demonstrate an understanding of the history, causes, and effects of global climate change

- Each graduate will demonstrate an understanding of evolutionary theory and its evidence in the fossil record
- Each graduate will demonstrate an understanding of the internal structure of Earth
- Each graduate will be able to explain the fundamental principles of the hydrologic cycle

## Geology, Geology, and the Environment, Overall

- **Outcome 1:** Each graduate will develop strong written and oral communication skills, demonstrate the ability to work in a collaborative environment, and exhibit professional attitudes and behavior.
  - Each graduate will deliver oral presentations, demonstrating the ability to effectively communicate discipline-specific concepts
  - Each graduate will write scholarly papers using acceptable format and organization with proper citations to appropriate literature.
  - Each graduate will actively participate in collaborative projects and in academic field trips
  - Each graduate will demonstrate professionalism and integrity in his/her academic conduct
  - Each graduate shall develop the ability to respect and integrate diverse worldviews in problem-solving frameworks
- **Outcome 2:** Each graduate shall possess and apply critical thinking and problem solving skills.
  - Each graduate will demonstrate the ability to develop valid research questions and hypotheses
  - Each graduate will demonstrate the ability to apply proper techniques for data acquisition and interpretation in a problem-solving context
  - Each graduate will demonstrate the ability to solve open-ended problems using scientific methodology
  - Each graduate will develop the ability to make informed, scientifically-based decisions regarding environmental issues
- **Outcome 3:** Each graduate shall develop skills in quantitative, qualitative, technological, laboratory, and field procedures.
  - Each graduate will learn and employ accepted laboratory and field techniques, protocols, and safety procedures
  - Each graduate will learn to read, construct, and comprehend thematic maps and derive perspective output from a map
  - Each graduate will demonstrate the ability to apply knowledge, concepts and techniques from complementary disciplines to solve problems

## Related Links

[Environmental Geoscience - Environmental Science, BS Program Page](#)

[Professional Licensure/Certification Page \(https://www.sru.edu/students/student-consumer-information/professional-licensures/\)](https://www.sru.edu/students/student-consumer-information/professional-licensures/)

## Curriculum Guide

### GPA Requirement

Major GPA: 2.0 or higher

Overall GPA: 2.0 or higher

### Summary\*

Code	Title	Hours
	Rock Studies 2 Requirements	45
	Other Basic Requirements	0-3

Major Requirements	53
Natural Science and Math College-Wide Requirements	9
Electives	13

\* All undergraduate degree programs require a minimum of 120 credits. Some courses meet multiple requirements, but are only counted once toward the 120 credit total required to graduate.

## Rock Studies 2 Requirements

Code	Title	Hours
<b>The Rock</b>		
SUBJ 139	Foundations of Academic Discovery <sup>1</sup>	3
ENGL 102	Critical Writing	3
ENGL 104	Critical Reading	3
MATH 225	Calculus I	4
Select one of the following:		
COMM 200	Civil Discourse: Theory & Practice	
PHIL 110	Ethics and Civil Discourse	
POLS 235	Civil Discourse and Democracy	
Subtotal		16
<b>Integrated Inquiry</b>		
<i>Creative and Aesthetic Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<i>Humanities Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<i>Social Science Inquiry</i>		
Select 3 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
<i>Natural Sciences Inquiry</i>		
CHEM 107	General Chemistry I	4
& CHEM 111	and General Chemistry I Lab <sup>2</sup>	
<i>Physical Science Inquiry</i>		
PHYS 216	University Physics 1 with Lab <sup>2</sup>	4
Subtotal		17
<b>Thematic Thread</b>		
Select 12 Credits ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> ) <sup>3</sup>		12
<b>Total Hours</b>		<b>45</b>

<sup>1</sup> Course offered in multiple subjects; cannot take course in first major subject.

<sup>2</sup> Course counts for 50% of Major requirements and Major GPA

<sup>3</sup> One course from each category; six credits must be 300-level or above; no more than 4 credits from one subject area; specific courses required in first major, regardless of prefix of course, cannot be used to satisfy thread requirements; any course with same prefix as first major cannot be used to satisfy thread requirements, even if it is not a course in the first major.

## Basic Math Requirement

Check with your adviser or a current degree audit report to see if you have been exempted from this course. The credit earned in this course will not be counted toward the 120 credit hour minimum needed to earn a degree.

Code	Title	Hours
Complete one of the following:		
Meet required minimum SAT or ACT math score OR		
ESAP 110	Beginning Algebra	0-3
<b>Total Hours</b>		<b>0-3</b>

## DIVERSITY, EQUITY, AND INCLUSION REQUIREMENT

Students must take and pass a course with the Diversity, Equity, and Inclusion (DEI) designation prior to graduation. Students can meet this requirement by taking any DEI - designated course in any program at any time during their undergraduate career.

## Major Requirements

- 30 major credits must be taken at SRU or PASSHE
- 30 major credits must be taken at the 300 level or above

Code	Title	Hours
<b>Environmental Geoscience Core</b>		
EGEO 131	Oceanography	3
GES 115	Introduction to Geospatial Technologies	3
GES 220	General Methods of Fieldwork	3
GES 325	Introduction to Geographic Information Science	3
Capstone		3
ENVS 440	Science, Technology and the Environment	
EGEO 450	Internship	
EGEO 399	Field Camp	
Subtotal		15
<b>Environmental Science Core Requirements</b>		
BIOL 114	Biology II: Foundations of Molecules, Genes and Cells with Lab	4
BIOL 401	Ecology with Lab	3
EGEO 121	Meteorology/Lab	4
EGEO 201	Earth Materials and Processes/Lab	4
EGEO 202	Earth History/Lab	4
EGEO 360	Introduction to Hydrology/Lab	3
EGEO 451	Geochemistry/Lab	4
GES 324	Environmental Law and Policy	3
GES 426	Environmental Modeling	3
Subtotal		32
<b>Electives - Environmental Science</b>		
6 credits required		6
BIOL 305	Wetlands and Aquatic Plants/Lab *	
BIOL 306	Freshwater Biomonitoring/Lab *	
BIOL 357	Environmental Microbiology with Lab *	
CHEM 340	Air Quality Assessment *	
CHEM 370	Water Quality Assessment *	
CHEM 425	Instrumental Analysis *	
CIVL 330	Environmental Engineering *	
EGEO 327	Structural Geology	
EGEO 303	Paleontology/Lab	
EGEO 328	Plate Tectonics	
EGEO 340	Air Pollution Meteorology	
EGEO 341	Geomorphology/Lab	

EGEO 342	Glacial Geology/Lab
EGEO 362	Stratigraphy/Lab
EGEO 460	Hydrogeology
EGEO 469	Field Investigations in the Geosciences
GES 315	Cartography I
GES 321	Introduction to UAS for Remote Sensing and Monitoring
GES 344	Environmental Justice
GES 345	Population Analysis
GES 361	Gender and the Environment
GES 362	Applications in Sustainability
GES 410	Remote Sensing
GES 425	Advanced Geographic Information Systems
MARS XXX	Marine Science Summer Course *
<b>Total Hours</b>	<b>53</b>

\* Some courses may require pre-requisites. Please see course descriptions to determine if there are any pre-requisites for that specific course.

## Required Related

Code	Title	Hours
These credits DO NOT count towards the major		
CHEM 108	General Chemistry II	3
CHEM 112	General Chemistry II Lab	1

<sup>1</sup> Course counts for 50% of Major requirements and Major GPA

## Natural Science and Math College-Wide Requirements

Code	Title	Hours
CHEM 107	General Chemistry I	3
CHEM 111	General Chemistry I Lab	1
MATH 225	Calculus I	4
PHYS 216	University Physics 1 with Lab	4
<b>Total Hours</b>		<b>12</b>

## Co-curricular and Experiential Learning

Students are encouraged to explore additional curricular and co-curricular opportunities. There is a strong correlation between long-term student success and participation in the following types of programs and activities:

1. International study programs (short-term, semester, and year-long)
2. Student-faculty research
3. Service Learning Courses
4. Internships
5. Volunteering

ENVIRONMENTAL GEOSCIENCE - BS (6124)  
Concentration in Environmental Science (ENSC)  
This program is effective as of Effective Fall 2020  
Revised 12.06.2021  
UCC 10.26.2021

## Important Curriculum Guide Notes

This Curriculum Guide is provided to help SRU students and prospective students better understand their intended major curriculum. Enrolled SRU students should note that the My Rock Audit may place already-earned and/or in progress courses in different, yet valid, curriculum categories. Enrolled SRU students should use the My Rock Audit Report and materials and information provided by their faculty advisers to ensure accurate progress towards degree completion. *The information on this guide is current as of the date listed. Students are responsible for curriculum requirements at the time of enrollment at the University.*

PASSHE - Pennsylvania State System of Higher Education Institutions

## Recommended Four-Year Plan

Course	Title	Hours
<b>First Year</b>		
<b>Fall</b>		
GES 115	Introduction to Geospatial Technologies	3
EGEO 131	Oceanography	3
SUBJ 139	Foundations of Academic Discovery <sup>1</sup>	3
ENGL 102	Critical Writing	3
ESAP 101	FIRST Seminar *	1
<b>Hours</b>		<b>13</b>
<b>Spring</b>		
ENGL 104	Critical Reading	3
EGEO 201	Earth Materials and Processes/Lab	4
BIOL 104		4
CHEM 107 & CHEM 111	General Chemistry I and General Chemistry I Lab	4
<b>Hours</b>		<b>15</b>
<b>Second Year</b>		
<b>Fall</b>		
EGEO 202	Earth History/Lab	4
Social Science Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
EGEO 121	Meteorology/Lab	4
MATH 225	Calculus I	4
Creative & Aesthetic Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Declare a Thematic Thread <sup>2</sup>		
<b>Hours</b>		<b>18</b>
<b>Spring</b>		
EGEO 203	Quantitative Methods	3
EGEO 272	Introduction to Georeports/Lab	1
Select one of the following:		3
COMM 200	Civil Discourse: Theory & Practice	
PHIL 110	Ethics and Civil Discourse	
POLS 235	Civil Discourse and Democracy	
Humanities Inquiry ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Major elective		4
<b>Hours</b>		<b>14</b>

**Third Year****Fall**

EGEO 451	Geochemistry/Lab	4
EGEO 360	Introduction to Hydrology/Lab	3
CHEM 200	Fundamentals of Organic Chemistry	3
PHYS 216	University Physics 1 with Lab	4
<b>Hours</b>		<b>14</b>

**Spring**

GES 324	Environmental Law and Policy	3
PHYS 217	University Physics 2 with Lab	4
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Major elective		3
Major elective		3
<b>Hours</b>		<b>16</b>

**Fourth Year****Fall**

BIOL 401	Ecology with Lab	3
BIOL 357	Environmental Microbiology with Lab	4
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Free elective/minor		3
<b>Hours</b>		<b>16</b>

**Spring**

BIOL 325	Biostatistics and Experimental Design with Lab	3
Major elective		3-4
Thematic Thread Requirement ( <a href="https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/">https://catalog.sru.edu/undergraduate/rock-studies/rock-studies-program/</a> )		3
Free elective/minor		3
Free elective/minor		2-3
<b>Hours</b>		<b>14-16</b>
<b>Total Hours**</b>		<b>120-122</b>

<sup>1</sup> Course offered in multiple subjects; cannot take course in first major subject

<sup>2</sup> Work with your Academic Adviser to declare a Thematic Thread by the end of your fall semester in your second year.

\* Students are encouraged to take ESAP 101 as a Free Elective.

**\*\* This document is meant to serve as a guide. Some planners may show more than 120 credits because faculty have created flexibility in choosing courses. However, only 120 credits are required to obtain a degree. Please consult with your academic adviser and refer to your curriculum guide prior to registering for courses. This plan should be reviewed, and verified, by you and your academic adviser at least once each academic year.**

Major Code: 6124

Concentration Code: ENSC

Revised: 08.27.2021