

# ENVIRONMENTAL GEOSCIENCE, BS

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## Faculty

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Climate change, environmental degradation, and resource management collectively encompass perhaps the greatest global challenge we face today. Study of the processes that link changes in the atmosphere, ocean, solid earth and biosphere has seen major advances in recent decades. The BS in Environmental Geoscience degree delivers in-depth study of these components of the dynamic earth system and the linkages among them. This fundamental understanding is augmented with practical applications in environments spanning local to global scales. This degree 1) prepares students for careers in environmental resource monitoring, remediation, and regulation associated with positions in private corporations, government agencies, and non-profit organizations, 2) provides the scientific underpinning for students moving into complementary fields of environmental management, law, policy, and education, and 3) offers a solid foundation for students interested in pursuing advanced degrees in the sciences and/or careers in research related to the study of the Earth system in public, corporate, or academic settings.

## Student Learning Outcomes

1. Explain process-based linkages among the lithosphere, climate, water, and life as illustrated by the Earth system over time.
2. Analyze and interpret general patterns in the history of the Earth-life system using geological records.
3. Describe local and global patterns of climate change and understand both spatial and temporal drivers of the climate system.
4. Infer Earth surface processes and environments and characterize ecosystem properties from field, lab and data-driven observations of sedimentary systems.
5. Use analytical, remote sensing, and/or numerical tools to characterize hydrologic systems in the surface and/or subsurface.
6. Effectively synthesize published literature related to Earth and Environmental sciences in a written report and/or a data product.
7. Develop written and verbal communication skills required to effectively convey science to a wide range of audiences.

## Requirements for B.S. Degree in Environmental Geoscience

The BS degree in Environmental Geoscience requires at least 64 credits of Earth and Environmental Science including auxiliary math and science coursework.

Code	Title	Credits
<b>Introductory Earth Science Courses</b>		
EAR 105 & EAR 104 or EAR 203	Earth Science and Earth Sciences Laboratory Earth System Science	4
Note: EAR 104 must be taken concurrently with EAR 105		
<b>Sequence Earth Science Course</b>		
EAR 210	History of Earth and Life	4
<b>Ancillary Science Courses</b>		
CHE 106 & CHE 107	General Chemistry Lecture I and General Chemistry Laboratory I	4
CHE 116 & CHE 117	General Chemistry Lecture II and General Chemistry Laboratory II	4
PHY 211 & PHY 221	General Physics I and General Physics Laboratory I	4
BIO 121	General Biology I	3
<b>Math Sequence</b>		
Select any combination of Calculus I and Calculus II or Elementary Probability and Statistics I from the following list:		6-8
MAT 285	Life Sciences Calculus I	
MAT 286	Life Sciences Calculus II	
MAT 295	Calculus I	
MAT 296	Calculus II	
MAT 221	Elementary Probability and Statistics I	
<b>Introduction to Earth and Environmental Science Skills Set</b>		
EAR 200	Selected Topics (Introduction to Field Methods)	2
EAR 200	Selected Topics (Introduction to Data Analysis)	2
<b>Core Courses in Environmental Geoscience</b>		
EAR 317	Sedimentary Processes and Systems	4
EAR 419	Environmental Aqueous Geochemistry	3
EAR 417 or BIO 345	Geochemistry Ecology and Evolution	3
EAR 401 or EAR 413	Hydrogeology Physical Hydrology	3
<b>Divisions of Environmental Geoscience</b>		
Choose one from each block that does not duplicate the above core classes. Other courses may be substituted by petition.		9
<b>Block 1: Environmental Data Analysis</b>		
EAR 311	Environmental Geophysics	
EAR 402	Numerical Methods in Geosciences	
EAR 410	Applications of GIS in the Earth Sciences	
<b>Block 2: Surface Processes</b>		
EAR 401	Hydrogeology	
EAR 403	Geomorphology	
EAR 413	Physical Hydrology	
<b>Block 3: Climate and Energy</b>		
EAR 305	The Energy Transition: Earth and Environmental Sciences	
EAR 405	Global Change:Geologic Record	
EAR 415	Introduction to Climate Dynamics	
<b>Upper Division Requirements</b>		
Select 7-credits of upper-division EAR or approved auxiliary science or mathematics courses		7

EAR 483	Departmental Colloquium (taken in junior or senior year)	1
<b>Total Credits</b>		<b>63-65</b>

## Requirements for Distinction in Environmental Geoscience

- GPA within department of 3.6
- Overall GPA, by end of senior year of 3.4

Other criteria required for the degree with distinction:

Students must complete a research-based senior thesis in conjunction with a faculty supervisor. The thesis must constitute independent, hypothesis-driven research involving investigative tools and techniques in the Earth Sciences. Students must submit the written thesis to the department and give a public seminar reporting their results. Students should register for EAR 409 Senior Thesis in Earth Science in the semester in which they plan to submit the thesis. All else being satisfied, Distinction is conferred following a vote of approval from the Faculty of the Department of Earth and Environmental Science.

### College of Arts and Sciences Requirements

For all Arts and Sciences|Maxwell students, successful completion of a bachelor's degree in this major requires a minimum of 120 credits, 96 of which must be Arts and Sciences|Maxwell credits, completion of the Liberal Arts Core (<https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text>) requirements, and the requirements for this major (30 credits) that are listed above.

### Dual Enrollments:

Students dually enrolled in **Newhouse\*** and Arts and Sciences|Maxwell will complete a minimum of 122 credits, with at least 90 credits in Arts and Sciences|Maxwell coursework and an Arts and Sciences|Maxwell major.

\*Students dually enrolled in the College of Arts and Sciences|Maxwell as first year students must complete the Liberal Arts Core (<https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text>). Students who transfer to the dual program after their first year as singly enrolled students in the Newhouse School will satisfy general requirements for the dual degree program by completing the Newhouse Core Requirements.

### Undergraduate University Requirements

The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (<https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/>)
- First Year Seminar (<https://coursecatalog.syracuse.edu/undergraduate/courses/fys/>)