GEOLOGY, BS

Gregory D. Hoke, Chair
204 Heroy Geology Laboratory
315-443-2672
earthenvsciences@syr.edu

Faculty

Tripti Bhattacharya, Daniel Curewitz, Gregory Hoke, Linda Ivany, Christopher Junium, Zunli Lu, Jessica Mejia, Aaron Mohammed, Robert Moucha, Cathryn Newton, Joshua Russell, Scott Samson, Christopher Scholz, Jay Thomas, John Tillotson, Sam Tuttle, Tao Wen

The study of geology provides insights into some of humanity's deepest questions. How was the planet Earth, our lifeboat in space, formed? What are the processes that have shaped the Earth - its surface and internal structure? How has life, of which humanity is a part, evolved? Why are there earthquakes, volcanoes, mountain chains, continents, and deep oceans? How has the surface and climate of the Earth changed through time? The study of geology is made up of interdisciplinary fields in the Earth sciences that draw on fundamental knowledge in physics, chemistry, biology, and mathematics and provides a basis for understanding natural hazards, climate variability and global change, and exploring for the energy, water and mineral resources upon which society depends. The BS in geology offers a solid foundation for students interested in pursuing advanced degrees in the Earth sciences and/or careers as research scientists in public, corporate, or academic settings.

Student Learning Outcomes

1. Explain process-based linkages among tectonics, climate, 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 and analytical and/or numerical tools.
3. Identify and describe the major rock-forming minerals and relate the origin of the three major rock types.
4. Infer depositional processes and environments from field and lab observations of sedimentary systems.
5. Describe tectonic processes and their manifestations in Earth's crust, including seismicity, volcanism, and deformation.
6. Effectively synthesize published literature related to geological 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 Geology

The BS degree in Geology requires at least 69 credits of Earth and Environmental Science course work including auxiliary math and science coursework.

Code	Title	Credits
Introductory Earth Science Courses		
EAR 105 & EAR 104	Earth Science and Earth Sciences Laboratory	4
or EAR 203	Earth System Science	
Note: EAR 104 is the laboratory course for EAR 105 and must be taken concurrently.		
Sequence Earth Science Course		
EAR 210	History of Earth and Life	4
Required Ancillary Sciences and Mathematics		
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
PHY 212 & PHY 222	General Physics II and General Physics Laboratory II	3
Any combination of Calculus I and Calculus II 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	
Introduction to Earth and Environmental Science Skills Set		
EAR 201	Introduction to Earth and Environmental Data Analysis	2
EAR 204	Introduction to Field Methods in Earth and Environmental Sciences	2
Core Courses in Geology		
EAR 314	Mineralogy	4
EAR 317	Sedimentary Processes and Systems	4
EAR 333	Structural Geology	4
EAR 417	Geochemistry	3
Department Colloquium		
EAR 483	Departmental Colloquium (taken in Junior or Senior Year)	1
Divisions of Earth Sciences		
Choose one from each block. Other courses may be substituted by petition.		12-15
Block 1: Solid Earth		
EAR 403	Geomorphology	
EAR 418	Petrology	
EAR 431	Plate Tectonics	
EAR 435	Geophysics	
Block 2: Water Science		
EAR 311	Environmental Geophysics	
EAR 401	Hydrogeology	
EAR 413	Physical Hydrology	
EAR 419	Environmental Aqueous Geochemistry	
Block 3: Ancient Climates and Ecosystems		
EAR 325	Introduction to Paleontology	
EAR 405	Global Change:Geologic Record	
EAR 415	Introduction to Climate Dynamics	
Block 4: Quantitative Skills		
EAR 402	Numerical Methods in Geosciences	
EAR 410	Applications of GIS in the Earth Sciences	
Department Electives		
Any lower or upper-division EAR or approved auxiliary science or math course(s)		3
Summer Field Experience		

(4-6 cr., by transfer, as approved field experience) This requirement consists of 6 credit hours of transfer credit as EAR 470. The requirement is satisfied by participation in an approved 4-6-week summer geological field camp, or through an alternative approved field program. The field experience is typically scheduled in the summer between junior and senior years, but completion of the requirement during the summer following graduation is also possible. Participation in the SU Abroad 'Frontiers Abroad' semester program in New Zealand also satisfies the field experience requirement. For enrollment in a traditional geological field camp, courses in Structural Geology and Sedimentary Geology may be required.		
EAR 470	Experience Credit	1-6
Total Credits		**65-75**

Requirements For Distinction

GPA Within Department 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 Sciences.

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/)