

Earth, Energy, and Environmental Sciences - Geoscience Emphasis, B.S.

Program Description

The Earth, Energy, and Environmental Sciences major is an interdisciplinary study of the relevant natural science disciplines, with emphases in either the Geosciences or the Environmental Sciences. This program provides knowledge and experience through lecture, laboratory, and field courses that immerse the students into the world around them. Students will analyze and solve problems associated with use of energy, water, and mineral resources; in protection of the environment; in planning for the impact of natural hazards; and in sustainable approaches to societal development. The region and ecosystems that surround Utah Tech University provide the ideal laboratory to apply concepts to the earth, energy, and environmental issues that impact the future of humanity. Emphases in the Geosciences and the Environmental Sciences are available depending on the student interests.

Program Curriculum

120 credits

Utah Tech General Education Requirements

All Utah Tech General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to Utah Tech's minimum General Education standards in American Institutions, English, and Mathematics.

General Education Core Requirements (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)

Code	Title	Hours
English		3-7
Mathematics		3-5
American Institutions		3-6
Life Sciences		3-10
Physical Sciences		3-5
Fine Arts		3
Literature/Humanities		3
Social & Behavioral Sciences		3

Earth, Energy, & Environmental Science Core Requirements

Code	Title	Hours
ENVS 1210 & ENVS 1215	Principles of Environmental Science and Principles of Environmental Science Laboratory	4
ENVS 2210	Environmental Pollution and Remediation Techniques	3
ENER 3310	Energy and the Environment	3
ENER 4310	Energy Technology and Sustainability	3
GEO 1110 & GEO 1115	Physical Geology (PS) and Physical Geology Lab (LAB)	4
GEO 2050	Earth Materials	4
GEO 3400	Water Resources	3
GEOG 3600 & GEOG 3605	Introduction to Geographic Information Systems and Introduction to Geographic Information Systems Laboratory	4
CHEM 1210 & CHEM 1215	Principles of Chemistry I (PS) and Principles of Chemistry I Lab (LAB)	5
CHEM 1220 & CHEM 1225	Principles of Chemistry II and Principles of Chemistry II Lab	5
BIOL 1610 & BIOL 1615	Principles of Biology I (LS) and Principles of Biology I Lab (LAB)	5

BIOL 3110	Scientific Writing	3
PHYS 2010	College Physics I (PS)	4
or PHYS 2210	Physics/Scientists Engineers I (PS)	
MATH 1060	Trigonometry (MA)	3
or MATH 1080	Pre-Calculus with Trigonometry (MA)	
PHYS 2015	College Physics I Lab	1
or PHYS 2215	Physics/Scientists Engineers I Lab	

Geoscience Emphasis Requirements

Code	Title	Hours
GEO 1220 & GEO 1225	Historical Geology and Historical Geology Lab	4
GEO 2700R	Field Methods in Geoscience Research	1
GEO 2990R	Career Seminar in Geology	1
GEO 3700	Structural Geology and Tectonics	4
GEO 4800R	Independent Research	1-3

required place-based course

Code	Title	Hours
Choose 1 of the following place-based courses:		
ENVS 3910	Biodiversity and Conservation in Costa Rica	3
ENVS 3920	Biodiversity and Conservation in the Peruvian Amazon	3
ENVS 3930	Biodiversity and Conservation in South Africa	3
GEO 3000	Advanced Geologic Investigation of Colorado Plateau Basin and Range provinces through national parks	3
GEO 3910	Applied Geologic Investigation of Iceland	3
GEO 3920	Applied Geological Investigation of the Andes	3
GEOG 3930	Remote Sensing of Landscape: China	3

elective requirements

Code	Title	Hours
Choose 22 elective credits from the following list:		
GEO 3060	Environmental Geology	3
GEO 3180	Paleontology	4
GEO 3200	Mineralogy	4
GEO 3500	Geomorphology	4
GEO 3550	Sedimentology & Stratigraphy	4
GEO 3600	Igneous and Metamorphic Petrology	4
GEO 3710	Hydrology	3
GEO 4000R	Selected Geology Field Excursions	1
GEO 4600	Field Geology	5
GEO 4800R	Independent Research	1-3
ENVS 3280	Environmental Law, Management and Policy	3
ENVS 3410	Air Quality and Control Technologies	3
ENVS 3510	Waste Management	3
ENVS 4080	Environmental Monitoring and Characterization	4
ENVS 4085	Environmental Monitoring and Characterization Laboratory	1
GEOG 4140	Advanced GIS Analysis	3
GEOG 3410	Paleoclimatology	3
GEOG 4180	Geoprocessing with Python	3
ENVS 3910	Biodiversity and Conservation in Costa Rica	3
ENVS 3920	Biodiversity and Conservation in the Peruvian Amazon	3
ENVS 3930	Biodiversity and Conservation in South Africa	3

GEOG 3930	Remote Sensing of Landscape: China	3
GEO 3000	Advanced Geologic Investigation of Colorado Plateau Basin and Range provinces through national parks	3
GEO 3910	Applied Geologic Investigation of Iceland	3
ENGL 2201	Literature and the Land (HU, GC)	3
MATH 1210	Calculus I (MA)	4

Graduation Requirements

1. Complete a minimum of 120 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).
3. Complete at least 30 upper-division credits at Utah Tech for institutional residency.
4. Cumulative GPA 2.0 or higher.
5. Grade C- or higher in all required courses.

Graduation Plan

1st Year

Fall Semester	Hours Spring Semester	Hours
ENGL 1010	3 BIOL 1610 & BIOL 1615	5
ENVS 1210 & ENVS 1215	4 ENGL 2010	3
GEO 1110 & GEO 1115	4 GEO 1220 & GEO 1225	4
MATH 1080 or 1060	5 CHEM 1210 & CHEM 1215	5
MATH 1060, MATH 1080, or Higher		
	16	17

2nd Year

Fall Semester	Hours Spring Semester	Hours
GEO 2050	4 GEO 2700R	1
GEO 2990R	1 ENVS 2210	3
PHYS 2010 or 2210	4 CHEM 1220 & CHEM 1225	5
PHYS 2015 or 2215	1 GE Fine Arts, American Institutions, or Social & Behavioral Sciences	3
GE Fine Arts, American Institutions, or Social & Behavioral Sciences	3 GE Fine Arts, American Institutions, or Social & Behavioral Sciences	3
Required and open electives	3	
	16	15

3rd Year

Fall Semester	Hours Spring Semester	Hours
GEO 3400	3 BIOL 3110	3
GEOG 3600 & GEOG 3605	4 Place-based course (3rd year F or S)	3
ENER 3310	3 Required and open electives	6
Place-based course (3rd Year F or S)	3 GEO 3700	4
	13	16

4th Year

Fall Semester	Hours Spring Semester	Hours
ENER 4310	3 GEO 4800R (F or S (or both))	1-3
GEO 4800R (F or S (or both))	1-3 Required and open electives	12

Required and open electives

9

13-15

13-15

Total Hours 119-123

BS Earth, Energy & Environmental Sciences - Geoscience Emphasis Program Learning Outcomes

At the successful conclusion of this program, students will be able to:

1. Consider the interdisciplinary nature of geological, environmental, and energy sciences, as well as their interrelationships with human activity.
2. Analyze environmental science issues and propose ethical solutions that account for cross-cultural and historical context at local and global scales.
3. Correlate geologic processes with Earth's energy sources and appraise our dependence and exploitation of those sources to support society.
4. Critically assess datasets from qualitative and quantitative research methods that explore solutions to earth, energy and environmental science issues.
5. Evaluate the effects of geologic time as they pertain to the interactive nature of and changes to Earth systems (Geosphere, atmosphere, hydrosphere, and biosphere).