

Earth, Energy, and Environmental Sciences - Environmental Science 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
Exploration		3-5

Earth, Energy, & Environmental Science Core Requirements

Code	Title	Hours
ENVS 1210 & ENVS 1215	Introduction to Environmental Science and Introduction to Environmental Science Laboratory	4
ENVS 2210	Environmental Pollution and Remediation Techniques	3
ENVS 3110 or BIOL 3110	Scientific Writing	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
GEOG 3410	Paleoclimatology	3
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
MATH 1060	Trigonometry (MA)	3
PHYS 2010 & PHYS 2015	College Physics I (PS) and College Physics I Lab (LAB)	5
ENGL 2201	Literature and the Land (HU, GC)	3

Environmental Science Emphasis Requirements

Code	Title	Hours
ENVS 2700R	Field Methods in Environmental Science	1
ENVS 2990R	Career Seminar in Environmental Science	1
ENVS 3510	Waste Management	3
ENVS 4080	Environmental Monitoring and Characterization	4
ENVS 4800R	Independent Research	1
ENVS 4910	Senior Seminar	1

Required Travel-Based Course

Code	Title	Hours
Choose 1 of the following travel based courses:		
ENVS 3910	Costa Rica Natural History	3
ENVS 3920	Peruvian Amazon Natural History	3
ENVS 3930	South Africa Natural History	3
GEO 3000	Advanced Geologic Investigation of Grand Canyon, Zion, and Bryce National Parks	3
GEO 3910	Applied Geologic Investigation of Iceland	3
GEOG 3930	Remote Sensing of Landscape: China	3

Upper Division Elective Requirements

Choose at least 15 upper division elective credits from the following list:

Code	Title	Hours
ENVS 3410	Air Quality and Control Technologies	3
ENVS 3210	Soil Science	3
ENVS 3280	Environmental Law, Management and Policy	3
ENVS 4099R	Special Topics in Environmental Science	1-3
GEOG 4140	Advanced GIS Analysis	3
GEOG 4180	Geoprocessing with Python	3
GEO 3710	Hydrology	3
GEO 3550	Sedimentology & Stratigraphy	4
GEO 3200	Mineralogy	4
GEO 3600	Igneous and Metamorphic Petrology	4
GEO 3500	Geomorphology	4
GEO 3700	Structural Geology and Tectonics	4
GEO 4600	Field Geology	5

Additional Elective Requirements

Choose 4 elective credits from the following list:

Code	Title	Hours
BIOL 3040 & BIOL 3045	General Ecology and General Ecology Lab	4
BIOL 3150	Biostatistics and the Scientific Method	3

BIOL 4200 & BIOL 4205	Plant Taxonomy (ALPP) and Plant Taxonomy Lab (ALPP)	4
BIOL 4260 & BIOL 4265	Herpetology and Herpetology Lab	3
BIOL 4270 & BIOL 4275	Ichthyology and Ichthyology Lab	3
BIOL 4280	Marine Biology	3
BIOL 4350 & BIOL 4355	Animal Behavior and Animal Behavior Lab	4
BIOL 4380 & BIOL 4385	Ornithology and Ornithology Lab	3
BIOL 4440 & BIOL 4445	General Entomology and General Entomology Lab	4
CHEM 4200	Environmental Chemistry	3
COMM 3250	Professional Communication: Writing, Design, and Presentations	3
COMM 3550	Organizational Communication	3
COMM 4020	Integrated Oral Presentations	3
BUS 3000	Intermediate Career Strategies	1
SCI 4700	Secondary Science Teaching Methods	3
SCI 4710	Innovative Solutions - Research and Design	1
SCI 4720	Innovative Solutions - Product Development	1
SCI 4730	Innovative Solutions - Entrepreneurship	1

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
ENVS 1210 & ENVS 1215	4 BIOL 1610 & BIOL 1615	5
GEO 1110 & GEO 1115	4 CHEM 1210	4
ENGL 1010	3 CHEM 1215	1
MATH 1060	3 GE Social & Behavioral Sciences	3
SSC 1010	2	
	16	13

2nd Year

Fall Semester	Hours Spring Semester	Hours
ENVS 2990R	1 ENVS 2210	3
GEOG 3410	3 ENVS 2700R	1
GEO 2050	4 CHEM 1220	4
PHYS 2010	4 CHEM 1225	1
PHYS 2015	1 ENGL 2201	3
ENGL 2010	3 GE American Institutions	3
	16	15

3rd Year

Fall Semester	Hours Spring Semester	Hours
GEO 3400	3 ENVS 3510	3

ENER 3310	3 BIOL 3110	3
GEOG 3600	3 GE Fine Arts	3
GEOG 3605	1 Upper Division Program Elective	3
Travel Based Course	3 Upper Division Program Elective	3
Upper Division Program Elective	3	
	16	15

4th Year

Fall Semester	Hours Spring Semester	Hours
ENER 4310	3 ENVS 4080	4
ENVS 4800R	1 ENVS 4910	1
Upper Division Program Elective	3 Upper Division Program Elective	3
Upper Division Program Elective	3 Upper Division Program Elective	3
Elective Credit	7 Elective Credit	3
	17	14

Total Hours 122**BS Earth, Energy and Environmental Sciences - Environmental Science 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).