

# 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.

Code	Title	Hours
General Education Core Requirements ( <a href="http://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext">catalog.utahtech.edu/programs/generaleducation/#gerequirementstext</a> )		
English		3-7
Mathematics		3-5
American Institutions		3-6
Life Sciences		3-10
Physical Sciences		3-5
Laboratory Science		0-1
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 3280	Environmental Policy, Regulations, Health, and Safety	3
ENVS 3410	Air Quality and Control Technologies	3
ENER 2310	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 2410	Paleoclimatology	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
MATH 1210	Calculus I (MA) (Prerequisite: MATH 1010 and MATH 1050 and MATH 1060 or MATH 1080 or equivalent placement score)	4
PHYS 2210 & PHYS 2215	Physics/Scientists Engineers I (PS) and Physics/Scientists Engineers 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	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
BIOL 1620 & BIOL 1625	Principles of Biology II and Principles of Biology II Lab	5
BIOL 3040 & BIOL 3045	General Ecology and General Ecology Lab	4
BIOL 3750 & BIOL 3755	Microbial Ecology and Microbial Ecology Laboratory	4
BIOL 4200 & BIOL 4205	Plant Taxonomy (ALPP) and Plant Taxonomy Lab (ALPP)	4

## Electives

Code	Title	Hours
Choose 1 of the following 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

## 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 ENGL 2010	3
ENGL 1010		3 ENGL 2201	3

MATH 1210 (Prerequisite: MATH 1010 and MATH 1050 and MATH 1060 or MATH 1080 or equivalent placement score)	4	PHYS 2210 & PHYS 2215	5
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**15** **16**

**2nd Year**

Fall Semester	Hours	Spring Semester	Hours
ENER 2310		3 ENVS 2210	3
GEOG 2410		3 GEO 2050	4
CHEM 1210 & CHEM 1215		5 CHEM 1220 & CHEM 1225	5
ENVS 2700R		1 BIOL 1620 & BIOL 1625	5
ENVS 2990R		1	

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**13** **17**

**3rd Year**

Fall Semester	Hours	Spring Semester	Hours
ENVS 3280		3 ENVS 3410	3
GEO 3400		3 GEOG 3600 & GEOG 3605	4
GE Fine Arts		3 ENVS 3510	3
BIOL 3040 & BIOL 3045		4 BIOL 3750 & BIOL 3755	4
GE American Institutions		3	

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**16** **14**

**4th Year**

Fall Semester	Hours	Spring Semester	Hours
ENER 4310		3 Elective Credit	7
Elective Credit		3 GE Social & Behavioral Science	3
ENVS 4080		4 ENVS 4910	1
ENVS 4800R		1 BIOL 4200 & BIOL 4205	4
GEO 3000 (Fall only elective, or Study Abroad Course)		3	

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**14** **15**

**Total Hours 120****Earth, Energy and Environmental Sciences - Environmental Science Emphasis Program Learning Outcomes**

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

1. Articulate the interdisciplinary nature of the issues related to geological, environmental, and energy sciences.
2. Formulate sustainable approaches to energy and earth science issues that integrate environmental, economic, and sociopolitical perspectives.
3. Distinguish between Earth's surface and deep energy sources and the processes they power and appraise how we depend on and harvest those energy resources to sustain our society.
4. Use appropriate methodological tools to analyze and address research questions in the earth, energy and environmental sciences.
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)