

EARTH AND SPACE SCIENCE (BS) - ENVIRONMENTAL SCIENCE TRACK

Program Overview

Earth and Space Science is an interdisciplinary field which works to advance humanity's understanding of the Earth and the wider universe.

Students are provided with a solid foundation in earth systems and processes (geosphere, hydrosphere, atmosphere, and biosphere) and the impacts humans have on these systems, both past and present. Additionally, students will learn about the origins of the planets and the exploration of the solar system. All four tracks in ESS combine classroom, laboratory, and field experiences, as well as provide opportunities for mentored research projects and hands-on learning experiences.

Environmental scientists study the transdisciplinary interactions between nature and humans to develop improved use of resources, management of habitats, and restoration of environments. The B.S. in Environmental Science curriculum integrates diverse fields of study to train students in systems thinking, critical analysis, and hands-on applications of theoretical knowledge, preparing students for successful careers in the rapidly growing industry of environmental management and protection, or for graduate study in Environmental Science and related fields.

The Environmental Science track combines a broad cross section of core courses and electives in Earth system science (Geology, Atmospheric Science, and Astronomy) with the study of natural systems (Environmental Science, Biology, Chemistry, Physics) and human perspectives (Anthropology), through which students gain both a firm foundation in the underpinning concepts of environmental science and the flexibility to develop specialized knowledge in each student's area of interest. Students engage in practical and real-world applications, developing proficiency in designing and conducting original research, and effectively communicating the results of these studies in both written and oral forms.

Career Opportunities

Students graduating with degrees in Environmental Sciences find gainful employment in private industry and the public sector. Graduates serve as environmental professionals in local, state, and federal environmental resource agencies; in the private sector as environmental consultants.

Program of Study

Code	Title	Credit Hours
Core IMPACTS Area : Institutional Priorities ¹		4-5
COMM 1110	Public Speaking	3
ITDS 1779	Scholarship Across the Disciplines	2
LEAD 1705	Introduction to Servant Leadership	2
PERS 1506	Perspectives 1-hour	1
PERS 1507	Perspectives 2-hour	2
Foreign Language Course Options		
ARAB, CHIN, FREN, GERM, GREK, ITAL, JAPN, KREN, LATIN, PORT, SPAN - 1001, 1002, 2001, 2002		
SWAH 1001	Elementary Swahili I	

SWAH 1002	Elementary Swahili II	
Core IMPACTS Area : Mathematics & Quantitative Skills ¹		3-7
DATA 1501	Introduction to Data Science	3
MATH 1001	Quantitative Skills and Reasoning	3
MATH 1101	Introduction to Mathematical Modeling	3
MATH 1111	College Algebra	3
MATH 1113	Pre-Calculus	4
MATH 1125	Applied Calculus	3
MATH 1131	Calculus with Analytic Geometry I	4
MATH 1132	Calculus with Analytic Geometry II	4
MATH 1165	Computer-Assisted Problem Solving	3
MATH 1401	Introduction to Statistics	3
MATH 1501	Calculus I	4
MATH 2125	Introduction to Discrete Mathematics	3
STAT 1401	Elementary Statistics	3
Core IMPACTS Area : Political Science and U.S. History		6
HIST 2111	U. S. History to 1865	3
or HIST 2112	U. S. History since 1865	
POLS 1101	American Government	3
Core IMPACTS Area : Arts, Humanities, and Ethics		6
Select one Fine Arts course		3
ARTH 1100	Art Appreciation	
ARTH 2125	Introduction to the History of Art I– Prehistoric through Gothic	
ARTH 2126	Introduction to the History of Art II– Renaissance through Modern	
MUSC 1100	Music Appreciation	
THEA 1100	Theatre Appreciation	
ITDS 1145	Comparative Arts ²	
Select one Humanities course		3
ENGL 2111	World Literature I	
ENGL 2112	World Literature II	
ITDS 1774	Introduction to Digital Humanities	
PHIL 2010	Introduction to Philosophy	
ITDS 1145	Comparative Arts ²	
Core IMPACTS Area : Communicating in Writing		6
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
Core IMPACTS Area : Technology, Mathematics, and Sciences ¹		7-11
ANTH 1145	Human Origins	3
ASTR 1105	Descriptive Astronomy: The Solar System	3
ASTR 1106	Descriptive Astronomy: Stars and Galaxies	3
ASTR 1305	Descriptive Astronomy Lab	1
ATSC 1112	Understanding the Weather	3
ATSC 1112L	Understanding the Weather Lab	1
BIOL 1125	Contemporary Issues in Biology Non-Lab	3
BIOL 1215K	Introductory Biology	4
BIOL 1225K	Contemporary Issues in Biology with Lab	4
CHEM 1151 & 1151L	Survey of Chemistry I and Survey of Chemistry I Lab	4
CHEM 1152 & 1152L	Survey of Chemistry II and Survey of Chemistry II Lab	4

CHEM 1211 & 1211L	Principles of Chemistry I and Principles of Chemistry I Lab	4
CHEM 1212 & 1212L	Principles of Chemistry II and Principles of Chemistry II Lab	4
CPSC 1105	Introduction to Computing Principles and Technology	3
CPSC 1301K	Computer Science I	4
ENVS 1105	Environmental Studies	3
ENVS 1105L	Environmental Studies Laboratory	1
ENVS 1205K	Sustainability and the Environment	4
GEOG 2215	Introduction to the Geographic Information Systems	3
GEOL 1110	Natural Disasters: Our Hazardous Environment	3
GEOL 1121	Introductory Geoscience I: Physical Geology	3
GEOL 1121L	Introductory Geoscience I: Physical Geology Lab	1
GEOL 1122	Introductory Geo-sciences II: Historical Geology	3
GEOL 1322	Introductory Geo-sciences II: Historical Geology Lab	1
GEOL 2225	The Fossil Record	4
PHYS 1111 & PHYS 1311	Introductory Physics I and Introductory Physics I Lab	4
PHYS 1112 & PHYS 1312	Introductory Physics II and Introductory Physics II Lab	4
PHYS 1125	Physics of Color and Sound	3
PHYS 1325	Physics of Color and Sound Lab	1
PHYS 2211 & PHYS 2311	Principles of Physics I and Principles of Physics I Lab	4
PHYS 2212 & PHYS 2312	Principles of Physics II and Principles of Physics II Lab	4
Core IMPACTS Area : Social Sciences		6
Select one Behavioral Science course		
ECON 2105	Principles of Macroeconomics	
ECON 2106	Principles of Microeconomics	
PHIL 2030	Moral Philosophy	
PSYC 1101	Introduction to General Psychology	
SOCI 1101	Introduction to Sociology	
Select one World Cultures course		3
ANTH 1107	Discovering Archaeology	
ANTH 1105	Cultural Anthropology	
ANTH 2105	Ancient World Civilizations	
ANTH 2136	Language and Culture	
ENGL 2136	Language and Culture	
GEOG 1101	World Regional Geography	
HIST 1111	World History to 1500	
HIST 1112	World History since 1500	
ITDS 1155	The Western Intellectual Tradition	
ITDS 1156	Understanding Non-Western Cultures	
Core IMPACTS Total Hours		42
Health and Wellness		3
KINS 1106	Lifetime Wellness	2
	or PHED 1205 Concepts of Fitness	
Select one PEDS course (https://catalog.columbusstate.edu/course-descriptions/peds/#peds)		

¹ The hours applied in the Institutional Priorities; Mathematics & Quantitative Skills; and Technology, Mathematics, and Sciences areas must add to 18 credit hours.

² ITDS 1145 Comparative Arts, though listed under both Fine Arts and Humanities, may be taken only once.

Major Requirements

Code	Title	Credit Hours
Core Requirements		
Complete the core requirements for this program		45
Core Total		45
Field of Study Requirements		
Minimum grade of C is required		
ASTR 1105	Descriptive Astronomy: The Solar System	3
ATSC 1112	Understanding the Weather	3
ENVS 1205K	Sustainability and the Environment	4
GEOL 1121	Introductory Geoscience I: Physical Geology	3
GEOL 1121L	Introductory Geoscience I: Physical Geology Lab	1
Select one of the following sequences:		4
Sequence 1:		
PHYS 1111	Introductory Physics I	
PHYS 1311	Introductory Physics I Lab	
Sequence 2:		
PHYS 2211	Principles of Physics I	
PHYS 2311	Principles of Physics I Lab	
Field of Study Requirements Total		18
Required for the Major		
Minimum grade of C is required		
ATSC 5117U	Global and Climate Change	3
BIOL 1215K	Introductory Biology	4
BIOL 3217K	Ecology	4
ENVS 4796	Senior Capstone	1
ENVS 3105	Foundations of Environmental Science	4
ENVS 5206U	Water Resources Management	4
GEOL 5255U	Environmental Geology	4
STAT 1401	Elementary Statistics	3
Choose one of the following (credits over 3 will be transferred to area H)		3
ENVS 5405U	Topics in Conservation	
GEOL 5258U	Field Methods in the Earth and Environmental Sciences	
Choose one of the following (credits over 3 will transfer to Area H)		3
GEOG 2215	Introduction to the Geographic Information Systems	
ENVS 5235U	Geographic Information and Global Positioning Systems	
Choose one course from the following (credits over 3 will transfer to Area H)		3
ATSC 5116U	Meteorology	
ATSC 5109U	Environmental Air Quality	
Required for the Major Total		36

Major Electives

1 hour from Area A (MATH 1113 or MATH 1131) 1

Select 23 credits from the following: 23

Hours transferred from Area G (GEOL, ATSC, ENVS)

Any 3000+ ATSC, ANTH, BIOL, CHEM, ENVS, GEOG or GEOL course

ANTH 1105 Cultural Anthropology (if not taken in Area D)

ANTH 5125U Human Ecology

ANTH 5175U Physical Anthropology and Archeology

ENVS 4698 Internship (with approval of advisor)

ENVS 5109U Environmental Air Quality

ENVS 5165U Hydrology

ENVS 5207U Experimental Design and Statistical Analysis

ENVS 5315U Stream Ecology

ENVS 5715U Earth and Space Sciences Seminar

ATSC 5125U Severe and Hazardous Weather

ATSC 5175U Hydrometeorology

GEOL 3201 Mineralogy and Petrology I

ASTR 3105 Physics, Chemistry, and Geology of the Solar System

GEOL 3265 Stratigraphy and Basin Analysis

GEOL 3275 Mapping and Field Geology

GEOL 5135U Oceanography

GEOL 5215U Geomorphology

GEOL 5275U Vertebrate Paleontology

GEOG 5215U Advanced Geographic Information Systems

BIOL 3215K Cell Biology

BIOL 3216K Genetics

BIOL 5246U Entomology

The following courses may be taken in Area H provided the required minimum of 39 upper level credit hours has been met:

CHEM 3111 Organic Chemistry I

ATSC 1112L Understanding the Weather Lab

GEOL 1110 Natural Disasters: Our Hazardous Environment

GEOL 2225 The Fossil Record

CHEM 3311 Organic Chemistry I Lab

CHEM 2115 Quantitative Chemical Analysis

CHEM 2315 Quantitative Chemical Analysis Lab

PHYS 1112 Introductory Physics II

PHYS 1312 Introductory Physics II Lab

PHYS 2212 Principles of Physics II

PHYS 2312 Principles of Physics II Lab

ASTR 1106 Descriptive Astronomy: Stars and Galaxies

ASTR 1305 Descriptive Astronomy Lab

Major Electives Total 24

Total Credit Hours 123

Program Map

Course	Title	Credit Hours
First Year		
Fall		
MATH 1113	Pre-Calculus (minimum grade of C)	4

ENGL 1101	English Composition I (minimum grade of C)	3
CHEM 1211	Principles of Chemistry I (minimum grade of C)	3
CHEM 1211L	Principles of Chemistry I Lab (minimum grade of C)	1
Area B2	ITDS 1779 (2), LEAD 1705 (2), PERS 1506 (1; may be repeated with different topic), PERS 1507 (2)	1

Of the nine courses listed in Area F under "Choose 3 or more credits," ENVS 1205K Sustainability and the Environment (4 cr) and ATSC 1112 Understanding the Weather (3 cr) are the recommended courses for this major.

Credit Hours 15
Spring

BIOL 1215K	Introductory Biology ¹	4
CHEM 1212	Principles of Chemistry II (minimum grade of C)	3
CHEM 1212L	Principles of Chemistry II Lab (minimum grade of C)	1
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1131	Calculus with Analytic Geometry I	4

Credit Hours 15
Second Year
Fall

PHYS 1111	Introductory Physics I (minimum grade of C)	3
PHYS 1311	Introductory Physics I Lab (minimum grade of C)	1
STAT 1401	Elementary Statistics (minimum grade of C)	3
Area E	ANTH1105 is recommended in Area E World Cultures as it is a pre-req for ENVS5226U	3
ENVS 3105	Foundations of Environmental Science (minimum grade of C)	4
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2

Credit Hours 16
Spring

PHYS 1112	Introductory Physics II (minimum grade of C)	3
PHYS 1312	Introductory Physics II Lab (minimum grade of C)	1
GEOL 1121	Introductory Geoscience I: Physical Geology (minimum grade of C)	3
GEOL 1121L	Introductory Geoscience I: Physical Geology Lab (minimum grade of C)	1
BIOL 3217K	Ecology (minimum grade of C) ²	4
Area B1	COMM 1110 Public Speaking or foreign language 1001, 1002, 2001, 2002	3

Credit Hours 15

Third Year**Fall**

CHEM 2115	Quantitative Chemical Analysis (minimum grade of C)	3
CHEM 2315	Quantitative Chemical Analysis Lab (minimum grade of C)	1
AREA C	Humanities	3
ENVS 5206U	Water Resources Management (minimum grade of C)	4
GEOL 5255U	Environmental Geology (minimum grade of C)	4
Credit Hours		15

Spring

GEOG 2215	Introduction to the Geographic Information Systems (minimum grade of C)	3
AREA G	Requirement (minimum grade of C)	3-4
AREA H	Elective	3-4
AREA C	Fine Arts	3
HIST 2111 or HIST 2112	U. S. History to 1865 or U. S. History since 1865	3
Credit Hours		15-17

Fourth Year**Fall**

AREA G	Requirement (minimum grade of C)	3-4
POLS 1101	American Government	3
AREA H	Elective	7-8
Credit Hours		13-15

Spring

AREA H	Electives	5-8
Area E	Behavioral Science	3
AREA G	Requirement (minimum grade of C)	3-4
PEDS Course		1
Credit Hours		12-16
Total Credit Hours		123

a minimum of 39 upper level (3000+ level) credit hours in order to graduate.

Admission Requirements

There are no program specific admission requirements.

Additional Program Requirements

Students must earn a "C" or better in all Area F and G courses.

¹ BIOL 1215K Introductory Biology is a prerequisite for some upper level ENVS and BIOL courses.

² The following courses are BIOL 3217K Ecology prerequisites for students in the Environmental Science track of the BS Earth and Space Sciences degree: BIOL 1215K Introductory Biology, CHEM 1211 Principles of Chemistry I, CHEM 1211L Principles of Chemistry I Lab, CHEM 1212 Principles of Chemistry II, CHEM 1212L Principles of Chemistry II Lab, and ENVS 3105 Foundations of Environmental Science.

- 1-4 hours from Area B may be used in Area H.
- ENVS 5405U Topics in Conservation is taught on a rotating basis. It is critical for you to meet with your advisor each semester in order to design a schedule that incorporates these classes during the semesters they are offered
- Area H courses are listed as 3 or 4 hours, although some Area H classes may be 5+ credit hours. Regardless of which courses are taken for Area H credit, all students must complete 24 total hours of Area H program electives. Additionally, all students must complete