

EARTH AND SPACE SCIENCE (BS) - SECONDARY EDUCATION 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.

Science teachers are in high demand across the state of Georgia, and across the US. The Muscogee County School District (Columbus, GA) currently guarantees graduates who complete certification requirements that they will have a job with the school district upon graduation. Our graduates have strong enough content knowledge to teach in most science classrooms, or to continue on towards graduate school or industry jobs. UTeach Columbus is an innovative program that prepares students for an exciting career in mathematics or science. Upon completion of the program, students will earn a degree in earth and space science, and be qualified to teach in a middle school or high school after passing the appropriate state certification examinations. Students completing this program are highly qualified for jobs utilizing their science knowledge, or for either informal education jobs or for work in a K-12 school setting. UTeach Columbus also provides close mentoring by Master Teachers, as well as having a dedicated advisor.

More information about UTeach Columbus can be obtained by calling 706-507-8612 or by visiting our website at <http://uteach.columbusstate.edu/index.php> (<http://uteach.columbusstate.edu/>).

All educator preparation programs are approved by the Georgia Professional Standards Commission. In addition to the degree requirements, there are further requirements for teaching certification. Visit the Certification page (<https://cctl.columbusstate.edu/certification.php>) on the CSU Center for Quality Teaching and Learning (CQTL) website for detailed information about certification requirements and the certification process.

Career Opportunities

- middle or high school science teacher
- education outreach at science museums, national parks
- work with geology or environmental science consulting firms

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		
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
GEOL 1122	Introductory Geo-sciences II: Historical Geology	3
Choose one following sequences:		4
Sequence 1:		
PHYS 1112	Introductory Physics II	
PHYS 1312	Introductory Physics II Lab	
Sequence 2:		
PHYS 2212	Principles of Physics II	
PHYS 2312	Principles of Physics II Lab	
Choose one of the following ASTR courses:		3
ASTR 3105	Physics, Chemistry, and Geology of the Solar System	
ASTR 3115	Introduction to Astrophysics	
UTeach Columbus Teaching Option: (Only two attempts allowed for each of the following courses)		
SPED 4115	Teaching Math and Science to Exceptional Learners (Students must earn a grade of B or better in order to be certified to teach in the state of Georgia.)	2

UTCH 1201	Step I: Inquiry Approaches to Teaching	1
UTCH 1202	Step II: Inquiry-Based Lesson Design	1
UTCH 2105	Knowing and Learning in Mathematics and Science	3
UTCH 2203	Step III: Technological and Pedagogical Content Knowledge	3
UTCH 3205	Classroom Interactions	3
UTCH 3215	Research Methods	3
UTCH 4205	Inquiry-Based Instruction	3
UTCH 4485	Student Teaching	9
UTCH 4795	Student Teaching Seminar	1
Required for the Major Total		42
Major Electives		
Total of at least 15 credits in ESS major courses over 3000 must be met in Area H, and a total of at least 18 hours in Area H courses.		
1 hour from Area A		1
1 hour from Area D		1
Choose one of the following GEOL courses:		4
GEOL 4275	Structural Geology	
GEOL 3201	Mineralogy and Petrology I	
Choose one of the following ENV5 courses:		4
ENV5 3105	Foundations of Environmental Science	
ENV5 5206U	Water Resources Management	
ENV5 5405U	Topics in Conservation	
Choose one of the following bio-geology courses:		3-4
GEOL 5135U	Oceanography	
GEOL 5165U	Hydrology	
GEOL 5215U	Geomorphology	
Choose one of the following Natural Hazards courses:		3-4
GEOL 5255U	Environmental Geology	
ATSC 5125U	Severe and Hazardous Weather	
ATSC 5116U	Meteorology	
Select 0-2 hours from the following (to total 18 Hours in Area H); Any 3000+ ATSC, ANTH, ASTR, BIOL, CHEM, ENV5, ENGR, GEOL or PHYS course		
Major Electives Total		18
Total Credit Hours		123

Program Map with Pre-Calculus

Course	Title	Credit Hours
First Year		
Fall		
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1113	Pre-Calculus (minimum grade of C)	4
Three credits will count in Area A and one credit will count in Area H		
GEOL 1121K	Introductory Geosciences I & Lab (minimum grade of C)	4
Area B1	COMM 1110 Public Speaking or foreign language 1001, 1002, 2001, 2002	3

AREA W	PEDS Elective	1
Credit Hours		15
Spring		
ENGL 1102	English Composition II (minimum grade of C)	3
GEOL 1122	Introductory Geo-sciences II: Historical Geology (minimum grade of C)	3
MATH 1131	Calculus with Analytic Geometry I (minimum grade of C)	4
Three credits will count in Area D and one credit in Area H		
UTCH 1201	Step I: Inquiry Approaches to Teaching (minimum grade of C)	1
HIST 2111	U. S. History to 1865	3
	or HIST 2112 or U. S. History since 1865	
Area B2	ITDS 1779 (2), LEAD 1705 (2), PERS 1506 (1; may be repeated with different topic), PERS 1507 (2)	1
Credit Hours		15
Second Year		
Fall		
CHEM 1211	Principles of Chemistry I (minimum grade of C)	3
CHEM 1211L	Principles of Chemistry I Lab (minimum grade of C)	1
POLS 1101	American Government	3
ATSC 1112	Understanding the Weather (minimum grade of C)	3
Area E	World Culture	3
UTCH 1202	Step II: Inquiry-Based Lesson Design (minimum grade of C)	1
ASTR 1105	Descriptive Astronomy: The Solar System (minimum grade of C)	3
ASTR 1105 is taught only in the fall		
Credit Hours		17
Spring		
CHEM 1212	Principles of Chemistry II (minimum grade of C)	3
CHEM 1212L	Principles of Chemistry II Lab (minimum grade of C)	1
ATSC 5117U	Global and Climate Change (minimum grade of C)	3
ATSC 5117U is taught only in the spring		
ENV5 1205K	Sustainability and the Environment (minimum grade of C)	4
AREA C	Fine Arts	3
UTCH 2105	Knowing and Learning in Mathematics and Science (minimum grade of C)	3
Credit Hours		17
Third Year		
Fall		
PHYS 1111	Introductory Physics I (minimum grade of C)	3
PHYS 1311	Introductory Physics I Lab (minimum grade of C)	1
AREA G2	ASTR class (minimum grade of C) ⁵	4

AREA H	Program Elective (ENVS) (minimum grade of C)	3
UTCH 2203	Step III: Technological and Pedagogical Content Knowledge (minimum grade of C)	3
UTCH 2203 is a fall only course		

Credit Hours 14

Spring

PHYS 1112	Introductory Physics II (minimum grade of C)	3
PHYS 1312	Introductory Physics II Lab (minimum grade of C)	1
AREA H	Elective (GEOL) (minimum grade of C)	3-4
Area C	Humanities	3
UTCH 3215	Research Methods (minimum grade of C)	3
UTCH 3215 is a spring only course		

Credit Hours 16-17

UTCH 3205	Classroom Interactions (minimum grade of C)	3
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Fourth Year

Fall

UTCH 4205	Inquiry-Based Instruction (minimum grade of C)	3
AREA H	Program Elective (Natural Hazards) (minimum grade of C) ⁹	3-4
AREA H	Program Elective (Bio-Geology) (minimum grade of C) ⁹	3-4
Area E	Behavioral Science	3
AREA H	Elective credits as needed (minimum grade if C)	3-0
PHED 1205 or KINS 1106	Concepts of Fitness or Lifetime Wellness	2

Credit Hours 17-16

Spring

UTCH 4485	Student Teaching	9
UTCH 4795	Student Teaching Seminar (minimum grade of C)	1
SPED 4115	Teaching Math and Science to Exceptional Learners (minimum grade of B; see note below)	2

There is a recent rule change for certification from the GaPSC. As of July 1, 2019, students must make a B or higher in the Exceptional Children's course. The course could be any of the following depending on your major: SPED 2256, EDCI 6228, KINS 4245, SPED 4115, PHED 6219. This rule change will not affect your graduation but you cannot become a certified educator with the state of Georgia until you receive the grade of B or higher in this course.

NOTE: During student teaching, no courses other than those listed above should be taken.

Credit Hours 12

Total Credit Hours 123

you should consult with your advisor to ensure that you will be able to take the courses in a timely manner so that you do not delay your graduation. This course map has been arranged so that the most commonly required prerequisites are scheduled in year 1 and year 2 to maximize options later.

- The program map illustrates appropriate coursework for completing a degree within 4 years, provided that course grades allow for earned credit. Please consult with your advisor to determine when courses can be switched out with others and taken in a different semester or sequence than illustrated, since not all courses are offered every semester.
- The map is for illustrative purposes only and does not constitute a legal contract on the part of CSU since degree requirements or course offerings could change. As always, check with your advisor.
- Students must complete "Area A" (ENGL 1101 English Composition I, ENGL 1102 English Composition II, and MATH 1001 Quantitative Skills and Reasoning or higher) prior to reaching 30 hours and earn a "C" or higher in ENGL 1101 and 1102.
- As of Fall 2013, all undergraduate students are required each semester to meet the 2.0 institutional GPA standard for satisfactory academic progress.

Program Map with with Calculus

Course	Title	Credit Hours
First Year		
Fall		
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1131	Calculus with Analytic Geometry I (minimum grade of C)	4
Area B1	COMM 1110 Public Speaking or foreign language 1001, 1002, 2001, 2002	3
GEOL 1121K	Introductory Geosciences I & Lab (minimum grade of C)	4
AREA W	PEDS Elective	
Credit Hours		14
Spring		
ENGL 1102	English Composition II (minimum grade of C)	3
GEOL 1122	Introductory Geo-sciences II: Historical Geology (minimum grade of C)	3
MATH 1132	Calculus with Analytic Geometry II (minimum grade of C)	4
UTCH 1201	Step I: Inquiry Approaches to Teaching (minimum grade of C)	1
HIST 2111 or HIST 2112	U. S. History to 1865 or U. S. History since 1865	3
Area B2	ITDS 1779 (2), LEAD 1705 (2), PERS 1506 (1; may be repeated with different topic), PERS 1507 (2)	1
Credit Hours		15

- Please note: Many of these courses are only offered once a year, or once every 3-4 semesters, and many of them have prerequisites. While you can rearrange the order in which you take your courses,

Second Year

Fall

CHEM 1211	Principles of Chemistry I (minimum grade of C)	3
CHEM 1211L	Principles of Chemistry I Lab (minimum grade of C)	1
POLS 1101	American Government	3
ATSC 1112	Understanding the Weather (minimum grade of C)	3
AREA E	World Culture	3
UTCH 1202	Step II: Inquiry-Based Lesson Design (minimum grade of C)	1
ASTR 1105	Descriptive Astronomy: The Solar System (minimum grade of C)	3
ASTR 1105 is offered only in fall		
Credit Hours		17

Spring

CHEM 1212	Principles of Chemistry II (minimum grade of C)	3
CHEM 1212L	Principles of Chemistry II Lab (minimum grade of C)	1
ATSC 5117U	Global and Climate Change (minimum grade of C)	3
ATSC 5117U is a spring only course		
ENVS 1205K	Sustainability and the Environment (minimum grade of C)	4
AREA C	Fine Arts	3
UTCH 2105	Knowing and Learning in Mathematics and Science (minimum grade of C)	3
Credit Hours		17

Third Year

Fall

PHYS 1111	Introductory Physics I (minimum grade of C)	3
PHYS 1311	Introductory Physics I Lab (minimum grade of C)	1
AREA G	ASTR class (minimum grade of C)	4
AREA H	Program Elective (ENVS) (minimum grade of C)	3
UTCH 2203	Step III: Technological and Pedagogical Content Knowledge (minimum grade of C)	3
UTCH 2203 is a fall only course		
Credit Hours		14

Spring

PHYS 1112	Introductory Physics II (minimum grade of C)	3
PHYS 1312	Introductory Physics II Lab (minimum grade of C)	1
AREA H	Program Elective (GEOL) (minimum grade of C)	3-4
Area C	Humanities Elective	3
UTCH 3215	Research Methods (minimum grade of C)	3
UTCH 3215 is a spring only course		

UTCH 3205	Classroom Interactions (minimum grade of C)	3
Credit Hours		16-17

Fourth Year

Fall

UTCH 4205	Inquiry-Based Instruction (minimum grade of C)	3
Area H	Program Elective (Natural Hazards) (minimum grade of C)	3
Area H	Program Elective (Bio-Geology) (minimum grade of C)	3
Area E	Behavioral Science	3
AREA H	Program credits as needed (minimum grade of C)	3-0
PHED 1205 or KINS 1106	Concepts of Fitness or Lifetime Wellness	2
Credit Hours		17-14

Spring

UTCH 4485	Student Teaching	9
UTCH 4795	Student Teaching Seminar (minimum grade of C)	1
SPED 4115	Teaching Math and Science to Exceptional Learners (minimum grade of B; see note below)	2

There is a recent rule change for certification from the GaPSC. As of July 1, 2019, students must make a B or higher in the Exceptional Children's course. The course could be any of the following depending on your major: SPED 2256, EDCI 6228, KINS 4245, SPED 4115, PHED 6219. This rule change will not affect your graduation but you cannot become a certified educator with the state of Georgia until you receive the grade of B or higher in this course.

Note: During student teaching, no courses other than those listed above should be taken.

Credit Hours		12
Total Credit Hours		122-120

- Please note: Many of these courses are only offered once a year, or once every 3-4 semesters, and many of them have prerequisites. While you can rearrange the order in which you take your courses, you should consult with your advisor to ensure that you will be able to take the courses in a timely manner so that you do not delay your graduation. This course map has been arranged so that the most commonly required prerequisites are scheduled in year 1 and year 2 to maximize options later.
- The program map illustrates appropriate coursework for completing a degree within 4 years, provided that course grades allow for earned credit. Please consult with your advisor to determine when courses can be switched out with others and taken in a different semester or sequence than illustrated, since not all courses are offered every semester.
- The map is for illustrative purposes only and does not constitute a legal contract on the part of CSU since degree requirements or course offerings could change. As always, check with your advisor.
- Students must complete "Area A" (ENGL 1101 English Composition I, ENGL 1102 English Composition II, and MATH 1001 Quantitative

Skills and Reasoning or higher) prior to reaching 30 hours and earn a "C" or higher in ENGL 1101 and 1102.

- As of Fall 2013, all undergraduate students are required each semester to meet the 2.0 institutional GPA standard for satisfactory academic progress.

Admission Requirements

Students must meet all requirements for admission to Teacher Education. For a list of current requirements, go to <https://cctl.columbusstate.edu/teacher-education.php>

Additional Program Requirements

Students must complete all courses related to their major with a C or better unless otherwise approved.

For teacher certification, students must obtain a minimum overall and CSU grade point average of 2.5.

Students must meet all requirements for admission to Teacher Education. For a list of current requirements, go to <https://cctl.columbusstate.edu/teacher-education.php>

Students must meet all requirements for admission to Student Teaching. For a list of current requirements, go to <https://cctl.columbusstate.edu/student-teaching.php>

To be recommended for teacher certification, students must pass the GACE Science Test I and Test II (<https://gace.ets.org/>).