

Earth & Space Science with Teaching, B.S.

Learn more about the Bachelor of Science in Earth and Space Science with Teaching (<https://www.temple.edu/academics/degree-programs/earth-and-space-science-with-teaching-major-st-estc-bs>).

The B.S. with Teaching in Earth & Space Science is part of Temple's innovative "TUteach" secondary education teacher-training program. The B.S. with Teaching provides broad training in earth & space science and prepares students for a career in secondary school teaching or an entry level position in environment science. The education courses in the B.S. with Teaching include supervised teaching in school district classrooms and emphasize inquiry-based approaches to learning. Students in the B.S. with Teaching degree program become eligible for a Pennsylvania teacher certification when they complete all the requirements for the degree that include theoretical and practical courses in education specifically designed for science and mathematics majors. In order to be recommended for Pennsylvania teacher certification, students must graduate with:

1. a B.S. with Teaching degree
2. meet GPA and testing requirements of the state of Pennsylvania.

Students will be scheduled once each semester to meet with the TUteach advisor to insure that students have knowledge of academic programming, internships opportunities, and testing options that include test preparation. The state of Pennsylvania has specific candidacy requirements. The TUteach advisor will also help the students complete and submit the candidacy documents. All students joining the program in their freshman year must complete the PAPA examination or acquire the PAPA waiver within their first 72 credits. Transfer students, from within Temple and those from other institutions, will build a tailored program with the academic and testing benchmarks structured for efficient degree completion with the TUteach advisor. Students are encouraged to complete the appropriate PRAXIS II examination prior to student teaching. Students are encouraged to take internship courses to expand their teaching portfolio or select elective courses that will extend their knowledge of science and teaching practice.

Undergraduate Contact Information:

Susan Varnum, Program Director
Professor of Chemistry
Associate Dean for Science Education
College of Science and Technology
629 Gladfelter Hall
215-204-6390 or 215-204-4073
susan.varnum@temple.edu

George Mehler, Master Teacher/Faculty Advisor (Science Education)
Assistant Professor
College of Science and Technology
628 Gladfelter Hall
215-204-4074
george.mehler@temple.edu

Kenneth Ruff, TUteach Faculty Advisor, Academic Programs Director
Assistant Professor
College of Science and Technology
656 Gladfelter Hall
215-204-3628
kruff@temple.edu

Dr. Nicholas Davatzes, Chair
Beury Hall, Room 307
215-204-2319
davatzes@temple.edu

Dr. Ilya Buynevich, Content Advisor
Beury Hall, Room 313
215-204-3635
coast@temple.edu

Summary of Requirements for the Degree

1. University Requirements (124 total s.h.)
 - MATH 0701 (4 s.h.) and/or ENG 0701 (4 s.h.), if required by placement testing.
 - All Temple students must take a minimum of two writing-intensive courses at Temple as part of their major. Following is a list of courses that can be used to satisfy the writing-intensive requirement:

Code	Title	Credit Hours
EES 2096	Climate Change: Oceans To Atmosphere (S)	
EES 2097	Process Geomorphology (F)	
EES 4696	Vertebrate Paleontology and Taphonomy (Fall of odd years)	
PHIL 2196	Perspectives on Science and Mathematics	
SECE 3796	Differentiated Literacy Instruction in the Disciplines, 7-12	

- Students must complete the General Education (GenEd) requirements.
 - See the General Education (<http://bulletin.temple.edu/undergraduate/general-education>) section of the *Undergraduate Bulletin* for the GenEd curriculum.
 - Students who complete TUteach majors typically receive a waiver for 1 Human Behavior (GB), 2 Science & Technology (GS) and 1 Quantitative Literacy (GQ) GenEd courses.
- Students must satisfy general Temple University residency requirements (<http://bulletin.temple.edu/undergraduate/academic-policies/academic-residency-requirements>).

2. College Requirements

- 90 credits within the College of Science & Technology (CST) or the College of Liberal Arts (CLA).
- 45 Upper Level (2000+) credits within the College of Science & Technology (CST) or the College of Liberal Arts (CLA).
- First Year Seminar Requirement: All students in the College of Science & Technology (CST) are required to take a 1 credit first year seminar course, SCTC 1001 CST First Year Seminar. Other courses that fulfill this requirement may be found on the CST College Requirements (<http://bulletin.temple.edu/undergraduate/science-technology/#collegerequirementstext>) page. Only one course in this category may count towards graduation.

3. Major Requirements for Bachelor of Science (85-86 s.h.)¹

At least 9 courses required for the major must be completed at Temple. At least 5 EES courses and 3 Education courses must be completed at Temple. Though not required, students are strongly encouraged to increase training and field work experience by enrolling in SCTC 1385, SCTC 2385, or SCTC 2389. Students will also benefit from directed laboratory projects offered through SCTC 3185. These courses are offered every semester.

Code	Title	Credit Hours
Chemistry		
Select one of the following:		4
CHEM 1031 & CHEM 1033	General Chemistry I and General Chemistry Laboratory I	
CHEM 1951 & CHEM 1953	Honors General Chemical Science I and Honors Chemical Science Laboratory I (F)	
Earth & Environmental Science		
EES 2001	Physical Geology	4
EES 2011	Mineralogy I (F)	4
EES 2096	Climate Change: Oceans To Atmosphere (S)	4
EES 3091	Research Methods (S)	3
5 Earth & Environmental Science electives numbered 2002 or above		20
Mathematics		
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
Physics		
PHYS 1004	Introduction to Astronomy (F)	3
Select one of the following:		4
PHYS 1061	Elementary Classical Physics I	
PHYS 1961	Honors Elementary Classical Physics I (F)	
PHYS 2021	General Physics I	
PHYS 2921	Honors General Physics I (F)	
Science/Math Foundation courses		
Select two of the following:		7-8
BIOL 1111 or BIOL 1911	Introduction to Organismal Biology Honors Introduction to Organismal Biology	

BIOL 2112 or BIOL 2912	Introduction to Cellular and Molecular Biology Honors Introduction to Cellular and Molecular Biology	
CHEM 1032 & CHEM 1034 or CHEM 1952 & CHEM 1954	General Chemistry II and General Chemistry Laboratory II Honors General Chemical Science II and Honors Chemical Science Laboratory II	
CHEM 2201 & CHEM 2203 or CHEM 2921 & CHEM 2923	Organic Chemistry I and Organic Chemistry Laboratory I Organic Chemistry for Honors I and Organic Honors Laboratory I	
MATH 1044 or MATH 1042 or MATH 1942	Introduction to Probability and Statistics for the Life Sciences Calculus II Honors Calculus II	
MATH 2031	Probability and Statistics	
PHYS 1062 or PHYS 1962 or PHYS 2022 or PHYS 2922	Elementary Classical Physics II Honors Elementary Classical Physics II General Physics II Honors General Physics II	
College of Science & Technology		
SCTC 1389	Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners	2
SCTC 3312	Coding STEM Lessons ²	1
Education		
EDUC 2179	Knowing and Learning in Mathematics and Science	3
EDUC 4388	TUteach Apprentice Teaching	6
EDUC 4802	TUteach Apprentice Teaching Seminar	1
SCES 2189 or SCTC 3485	Classroom Interactions (S) Science and Mathematics in the Classroom	3
SCES 4189 or SCTC 4485	Project-Based Instruction (F) Integrating STEM Practice in Diverse Teaching Environments	3
SECE 3796	Differentiated Literacy Instruction in the Disciplines, 7-12	3
SPED 2231	Introduction to Inclusive Education	3
Philosophy/History		
Select one of the following:		3
PHIL 2196	Perspectives on Science and Mathematics	
SCTC 3001	History of Science	
Total Credit Hours		85-86

Code	Title	Credit Hours
(F) - Fall only course		
(S) - Spring only course		

¹ The certification requirements need to meet Pennsylvania Department of Education standards and are subject to change. All students are strongly recommended to check with the TUteach Advisor in the College of Science and Technology, to affirm the requirements that pertain to their specific major. In addition, students should check the *Undergraduate Bulletin* web site for the most current information about these programs, or the TUteach web site (<https://cst.temple.edu/academics/accelerated-programs/tuteach>). It is also recommended that all students meet with an advisor before enrolling in classes specific to these majors and leading to certification as a teacher. This is to assure that a candidate's intended program of study will be compatible with the new requirements.

² All students are required to complete a minimum of one credit.

Calculation of Major GPA

Courses listed under the major requirements for the degree will be included in the calculation of the major GPA. Courses that could not apply toward the major as an elective or required course would not be counted in the calculation of the major GPA. This would include CHEM 1027, for example.

Distinction in Major

To graduate with a Distinction in Earth & Space Science with Teaching, students must:

- Achieve a 3.50 GPA or better for the aggregate of courses required for the major.
- Achieve a 3.50 GPA or better in the content area courses required for the major.
- Achieve a 3.90 GPA in the following courses:

Code	Title	Credit Hours
SCES 2189 or SCTC 3485	Classroom Interactions Science and Mathematics in the Classroom	3
SCES 4189 or SCTC 4485	Project-Based Instruction Integrating STEM Practice in Diverse Teaching Environments	3
EDUC 4802	TUteach Apprentice Teaching Seminar	1
EDUC 4388	TUteach Apprentice Teaching	6

Suggested Academic Plan

Bachelor of Science in Earth & Space Science with Teaching

Requirements for New Students starting in the 2019-2020 Academic Year

Year 1		Credit Hours
Fall		
EES 2001	Physical Geology	4
MATH 1041 or 1941	Calculus I	4
SCTC 1001	CST First Year Seminar	1
SCTC 1389	Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners	2
General Education/Elective Credits		5
Term Credit Hours		16
Spring		
Select one of the following:		4
CHEM 1031 & CHEM 1033	General Chemistry I	
CHEM 1951 & CHEM 1953	Honors General Chemical Science I (F)	
General Education/Elective Credits		10
Term Credit Hours		14
Year 2		
Fall		
EES 2011	Mineralogy I (F)	4
Select one of the following:		4
PHYS 1061	Elementary Classical Physics I	
PHYS 1961	Honors Elementary Classical Physics I (F)	
PHYS 2021	General Physics I	
PHYS 2921	Honors General Physics I (F)	
EDUC 2179	Knowing and Learning in Mathematics and Science	3
SPED 2231	Introduction to Inclusive Education	3
General Education/Elective Credits		3
Term Credit Hours		17
Spring		
EES 2096	Climate Change: Oceans To Atmosphere [WI] (S) ¹	4
Science Foundation Elective (see approved list)		3-4
SECE 3796	Differentiated Literacy Instruction in the Disciplines, 7-12 [WI]	3

General Education/Elective Credits		6-5
Term Credit Hours		16
Year 3		
Fall		
Earth & Environmental Science 2002+ Elective ²		4
PHYS 1004	Introduction to Astronomy (F)	3
Science Foundation Elective (see approved list)		4
Select one of the following:		3
PHIL 2196	Perspectives on Science and Mathematics [WI]	
SCTC 3001	History of Science	
General Education/Elective Credits		3
Term Credit Hours		17
Spring		
Earth & Environmental Science 2002+ Elective ²		4
Earth & Environmental Science 2002+ Elective ²		4
EES 3091	Research Methods (S)	3
Select one of the following:		3
SCES 2189	Classroom Interactions (S)	
SCTC 3485	Science and Mathematics in the Classroom	
General Education/Elective Credits		3
Term Credit Hours		17
Year 4		
Fall		
Earth & Environmental Science 2002+ Elective ²		4
Earth & Environmental Science 2002+ Elective ²		4
Select one of the following:		3
SCES 4189	Project-Based Instruction (F)	
SCTC 4485	Integrating STEM Practice in Diverse Teaching Environments	
SCTC 3312	Coding STEM Lessons ³	1
General Education/Elective Credits		5
Term Credit Hours		17
Spring		
EDUC 4388	TUteach Apprentice Teaching	6
EDUC 4802	TUteach Apprentice Teaching Seminar	1
General Education/Elective Credits		3
Term Credit Hours		10
Total Credit Hours:		124

- ¹ This course is offered in even Spring terms.
- ² Earth & Environmental Science electives must be numbered 2002 or above.
- ³ All students are required to complete a minimum of one credit.

Code	Title	Credit Hours
(F) - Fall only course.		
(S) - Spring only course.		