

Earth and Space Science with Teaching BS

Overview

The Department of Earth and Environmental Science provides students the opportunity to study the Earth with a variety of traditional and environmental geology course work. The faculty work closely with students to give a combination of field-based experience and current laboratory and computational techniques.

The **Bachelor of Science in Earth and Space Science with Teaching** is part of Temple's innovative "TUteach" secondary education teacher-training program. The BS in Earth and Space Science with Teaching provides broad training in earth and space science and prepares students for a career in secondary school teaching or an entry level position in environment science. The education courses in this major include supervised teaching in school district classrooms and emphasize inquiry-based approaches to learning. Students in the BS in Earth and Space Science 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 BS with Teaching degree and
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 ensure 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.

Campus Location: Main

Program Code: ST-ESTC-BS

Distinction in Major

To graduate with distinction in this major, a student must satisfy the following criteria:

- achieve a minimum 3.5 major GPA;
- achieve a minimum 3.5 GPA in the content area courses required for the major; and
- achieve a minimum 3.9 GPA in the following courses:
 - SCES 2189 or SCTC 3485
 - SCES 4189 or SCTC 4485
 - EDUC 4802
 - EDUC 4388.

Undergraduate Contact Information

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

George Mehler, Master Teacher/Faculty Advisor (Science Education) and Assistant Professor of Practice
College of Science and Technology
Gladfelter Hall, Room 644
215-204-4074
george.mehler@temple.edu

Kenneth Ruff, TUteach Faculty Advisor, Academic Programs Director, and Assistant Professor of Practice
College of Science and Technology
Gladfelter Hall, Room 656
215-204-3628

kruff@temple.edu

Nicholas Davatzes, Department of Earth and Environmental Science Chair
Beury Hall, Room 307
215-204-2319
davatzes@temple.edu

Ilya Buynevich, Content Advisor for the Department of Earth and Environmental Science
Beury Hall, Room 313
215-204-3635
coast@temple.edu

Learn more about the Bachelor of Science in Earth and Space Science with Teaching.

These requirements are for students who matriculated in academic year 2023-2024. Students who matriculated prior to fall 2023 should refer to the Archives to view the requirements for their Bulletin year.

Bachelor of Science Requirements

Summary of Requirements for the Degree

1. University Requirements (124 total s.h.)

- Students must complete all University requirements including those listed below.
- All undergraduate students must complete at least two writing-intensive courses for a total of at least six credits at Temple as part of their major. The specific writing-intensive course options for this major are:

| 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) | |
| MGSE 3796 | Differentiated Literacy Instruction in the Disciplines (grades 7-12) | |

- Students must complete the General Education (GenEd) requirements.
 - See the General Education section of the *Undergraduate Bulletin* for the GenEd curriculum.
 - Students who complete TTeach majors 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.

2. College Requirements

- A minimum of 90 total credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA), and/or the College of Engineering (ENG).
 - A minimum of 45 of these credits must be upper-level (courses numbered 2000 and above).
- Complete a one-credit first-year or transfer seminar.
 - SCTC 1001 CST First Year Seminar for every entering first-year CST student.
 - SCTC 2001 CST Transfer Seminar for every entering transfer CST student.

3. Major Requirements for Bachelor of Science (88-89 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 | Calculus I | 4 |
| or MATH 1941 | Honors Calculus I | |

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 | Introduction to Organismal Biology | |
| or BIOL 1911 | Honors Introduction to Organismal Biology | |
| BIOL 2112 | Introduction to Cellular and Molecular Biology | |
| or BIOL 2912 | Honors Introduction to Cellular and Molecular Biology | |
| CHEM 1032 & CHEM 1034 | General Chemistry II and General Chemistry Laboratory II | |
| or CHEM 1952 & CHEM 1954 | Honors General Chemical Science II and Honors Chemical Science Laboratory II | |
| CHEM 2201 & CHEM 2203 | Organic Chemistry I and Organic Chemistry Laboratory I | |
| or CHEM 2921 & CHEM 2923 | Organic Chemistry for Honors I and Organic Honors Laboratory I | |
| MATH 1044 | Introduction to Probability and Statistics for the Life Sciences | |
| or MATH 1042 | Calculus II | |
| or MATH 1942 | Honors Calculus II | |
| MATH 2031 | Probability and Statistics | |
| PHYS 1062 | Elementary Classical Physics II | |
| or PHYS 1962 | Honors Elementary Classical Physics II | |
| or PHYS 2022 | General Physics II | |
| or PHYS 2922 | Honors General Physics II | |

College of Science & Technology

| | | |
|-----------|--|---|
| SCTC 1013 | Elements of Data Science for the Physical and Life Sciences | 3 |
| SCTC 1389 | Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners | 2 |
| SCTC 3001 | History of Science | 3 |
| SCTC 3312 | Coding STEM Lessons ² | 1 |

Education

| | | |
|--------------|--|---|
| EDUC 2179 | Knowing and Learning in Mathematics and Science | 3 |
| EDUC 4388 | TUteach Apprentice Teaching | 4 |
| EDUC 4802 | TUteach Apprentice Teaching Seminar | 3 |
| MGSE 2189 | Classroom Interactions (S) | 3 |
| or SCTC 3485 | Science and Mathematics in the Classroom | |
| MGSE 3796 | Differentiated Literacy Instruction in the Disciplines (grades 7-12) | 3 |
| MGSE 4189 | Project-Based Instruction (F) | 3 |
| or SCTC 4485 | Integrating STEM Practice in Diverse Teaching Environments | |
| SPED 2231 | Introduction to Special Education | 3 |

Total Credit Hours**88-89**

| 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. 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.

Suggested Academic Plan

Bachelor of Science in Earth and Space Science with Teaching

Suggested Plan for New Students Starting in the 2023-2024 Academic Year

| Year 1 | | Credit Hours |
|--|--|--------------|
| Fall | | |
| EES 2001 | Physical Geology | 4 |
| MATH 1041 or MATH 1941 | Calculus I or Honors Calculus I | 4 |
| SCTC 1001 | CST First Year Seminar | 1 |
| SCTC 1013 | Elements of Data Science for the Physical and Life Sciences | 3 |
| SCTC 1389 | Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners | 2 |
| GenEd Breadth Course | | 3 |
| Credit Hours | | 17 |
| Spring | | |
| 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) | |
| ENG 0802 or ENG 0812 or ENG 0902 | Analytical Reading and Writing or Analytical Reading and Writing: ESL or Honors Writing About Literature | 4 |
| GenEd Breadth Course | | 3 |
| Elective | | 3 |
| 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 Special Education | 3 |
| IH 0851 or IH 0951 | Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life | 3 |
| Credit Hours | | 17 |

| | | |
|---|--|------------|
| Spring | | |
| EES 2096 | Climate Change: Oceans To Atmosphere (S) ¹ | 4 |
| Science Foundation Elective (see approved list) | | 3-4 |
| MGSE 3796 | Differentiated Literacy Instruction in the Disciplines (grades 7-12) | 3 |
| IH 0852 or IH 0952 | Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good | 3 |
| Elective | | 3-2 |
| 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 |
| SCTC 3001 | History of Science | 3 |
| GenEd Breadth Course | | 3 |
| 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 |
| MGSE 2189 | Classroom Interactions (S) | |
| SCTC 3485 | Science and Mathematics in the Classroom | |
| Elective | | 3 |
| 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 |
| MGSE 4189 | Project-Based Instruction (F) | |
| SCTC 4485 | Integrating STEM Practice in Diverse Teaching Environments | |
| SCTC 3312 | Coding STEM Lessons ³ | 1 |
| GenEd Breadth Course | | 3 |
| Elective | | 1 |
| Credit Hours | | 16 |
| Spring | | |
| EDUC 4388 | TUteach Apprentice Teaching | 4 |
| EDUC 4802 | TUteach Apprentice Teaching Seminar | 3 |
| Elective | | 3 |
| 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. | | |