Earth & Space Science with Teaching, B.S.


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. 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. Finally, students are encouraged to complete the appropriate PRAXIS II examination prior to student teaching.

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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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES 2096</td>
<td>Climate Change: Oceans To Atmosphere (S)</td>
<td></td>
</tr>
</tbody>
</table>
Earth & Space Science with Teaching, B.S.

- 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).

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

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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES 2097</td>
<td>Process Geomorphology (F)</td>
<td></td>
</tr>
<tr>
<td>EES 4696</td>
<td>Vertebrate Paleontology and Taphonomy (Fall of odd years)</td>
<td></td>
</tr>
<tr>
<td>PHIL 2196</td>
<td>Perspectives on Science and Mathematics</td>
<td></td>
</tr>
<tr>
<td>SECE 3796</td>
<td>Differentiated Literacy Instruction in the Disciplines, 7-12</td>
<td></td>
</tr>
</tbody>
</table>

- Chemistry
  - Select one of the following: 4
    - CHEM 1031 General Chemistry I
    - CHEM 1033 and General Chemistry Laboratory I
    - CHEM 1951 Honors General Chemical Science I
    - CHEM 1953 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
  - 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
      - BIOL 1911 Honors Introduction to Organismal Biology
    - BIOL 2112 Introduction to Cellular and Molecular Biology
      - BIOL 2912 Honors Introduction to Cellular and Molecular Biology
    - CHEM 1032 General Chemistry II
      - CHEM 1034 and General Chemistry Laboratory II
      - CHEM 1952 Honors General Chemical Science II
      - CHEM 1954 and Honors Chemical Science Laboratory II
CHEM 2201  Organic Chemistry I
& CHEM 2203  and Organic Chemistry Laboratory I
or CHEM 2921  Organic Chemistry for Honors I
& CHEM 2923  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 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  TUtach Apprentice Teaching 6
EDUC 4802  TUtach Apprentice Teaching Seminar 1
SCES 2189  Classroom Interactions (S) 3
or SCTC 3485  Science and Mathematics in the Classroom 3
SCES 4189  Project-Based Instruction (F) 3
or SCTC 4485  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

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 TUtach 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 TUtach web site (http://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.

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:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>SCES 2189</td>
<td>Classroom Interactions</td>
<td>3</td>
</tr>
<tr>
<td>or SCTC 3485</td>
<td>Science and Mathematics in the Classroom</td>
<td></td>
</tr>
<tr>
<td>SCES 4189</td>
<td>Project-Based Instruction</td>
<td>3</td>
</tr>
<tr>
<td>or SCTC 4485</td>
<td>Integrating STEM Practice in Diverse Teaching Environments</td>
<td></td>
</tr>
<tr>
<td>EDUC 4802</td>
<td>TUteach Apprentice Teaching Seminar</td>
<td>1</td>
</tr>
<tr>
<td>EDUC 4388</td>
<td>TUteach Apprentice Teaching</td>
<td>6</td>
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</table>

**Suggested Academic Plan**

**Bachelor of Science in Earth & Space Science with Teaching**

**Requirements for New Students starting in the 2018-2019 Academic Year**

**Year 1**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES 2001</td>
<td>Physical Geology</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1041 or 1941</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>SCTC 1389</td>
<td>Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners</td>
<td>2</td>
</tr>
<tr>
<td>General Education/Elective Credits</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

**Spring**

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1031</td>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 1033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 1951</td>
<td>Honors General Chemical Science I (F)</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 1953</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education/Elective Credits</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

**Year 2**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES 2011</td>
<td>Mineralogy I (F)</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 1961</td>
<td>Honors Elementary Classical Physics I (F)</td>
<td></td>
</tr>
<tr>
<td>PHYS 2021</td>
<td>General Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 2921</td>
<td>Honors General Physics I (F)</td>
<td></td>
</tr>
<tr>
<td>EDUC 2179</td>
<td>Knowing and Learning in Mathematics and Science</td>
<td>3</td>
</tr>
<tr>
<td>SPED 2231</td>
<td>Introduction to Inclusive Education</td>
<td>3</td>
</tr>
<tr>
<td>General Education/Elective Credits</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EES 2096</td>
<td>Climate Change: Oceans To Atmosphere [WI] (S)¹</td>
<td>4</td>
</tr>
<tr>
<td>Science Foundation Elective (see approved list)</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>SECE 3796</td>
<td>Differentiated Literacy Instruction in the Disciplines, 7-12 [WI]</td>
<td>3</td>
</tr>
<tr>
<td>General Education/Elective Credits</td>
<td></td>
<td>6-5</td>
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</tbody>
</table>

**Year 3**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth &amp; Environmental Science 2002+ Elective²</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1004</td>
<td>Introduction to Astronomy (F)</td>
<td>3</td>
</tr>
<tr>
<td>Science Foundation Elective (see approved list)</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

¹ [WI] denotes Writing Intensive course.
² [S] denotes Satisfactory/ Unsatisfactory grading.
Select one of the following:  
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 4
Earth & Environmental Science 2002+ Elective 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 4
Earth & Environmental Science 2002+ Elective 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 1

General Education/Elective Credits 5

Term Credit Hours 17

Spring

EDUC 4388 TUtachi Apprentice Teaching 6
EDUC 4802 TUtachi 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>(F)</td>
<td>Fall only course.</td>
<td></td>
</tr>
<tr>
<td>(S)</td>
<td>Spring only course.</td>
<td></td>
</tr>
</tbody>
</table>