General Science with Teaching, B.S.

Learn more about the Bachelor of Science in General Science with Teaching.

The B.S. with Teaching in General Science is part of Temple’s innovative “TUteach” secondary education teacher-training program. The B.S. with Teaching provides broad training in general science and prepares students for a career in secondary school teaching or an entry level laboratory position. 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 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.

Undergraduate Contact Information:

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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. The courses that can be used to satisfy the writing-intensive requirement for this major are: SCTC 2396 and MGSE 3796. Alternative disciplinary writing-intensive course substitutions for SCTC 2396 may be approved by both the TUteach Program Director and CST faculty advisors in Biology, Chemistry, Earth and Environmental Science, or Physics. Following is a list of these alternative writing-intensive courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 2296</td>
<td>Genetics (S)</td>
<td></td>
</tr>
<tr>
<td>BIOL 3096</td>
<td>Cell Structure and Function (F)</td>
<td></td>
</tr>
<tr>
<td>BIOL 3396</td>
<td>Scientific Writing for Biology: The Art of Communicating (S)</td>
<td></td>
</tr>
<tr>
<td>CHEM 4196</td>
<td>Techniques of Chemical Measurement II</td>
<td></td>
</tr>
</tbody>
</table>
General Science with Teaching, B.S.

CHEM 3397  &  CHEM 3398  
Physical Chemistry Laboratory I  
and Physical Chemistry Laboratory II

PHIL 2596  
Philosophical Perspectives on the Environment

PHYS 2796  
Introduction to Modern Physics (S)

PHYS 4796  
Experimental Physics (S)

• Students must complete the General Education (GenEd) requirements.
  • See the 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.

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 page. Only one course in this category may count towards graduation.

3. Major Requirements for Bachelor of Science (84-92 s.h.)

At least 9 courses required for the major must be completed at Temple. At least 6 courses in CST and 3 courses in Education must be completed at Temple. In addition, 2 of the 4 concentration area 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.

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<tbody>
<tr>
<td>BIOL 1011</td>
<td>General Biology I (F)</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 1012</td>
<td>General Biology II (S)</td>
<td>4</td>
</tr>
</tbody>
</table>

Chemistry

Select one of the following:

- 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)

Select one of the following:

- 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 (S)

Earth & Environmental Science

EES 1001  
Introductory Geology

or EES 2001  
Physical Geology

Mathematics

Select one of the following:

- MATH 1031  
  Differential and Integral Calculus

- MATH 1041  
  Calculus I

& MATH 1042  
and Calculus II

- MATH 1041  
  Calculus I

& MATH 1044  
and Introduction to Probability and Statistics for the Life Sciences

- MATH 1941  
  Honors Calculus I

& MATH 1942  
and Honors Calculus II

Physics

PHYS 1004  
Introduction to Astronomy (F)

PHYS 1021  
Introduction to General Physics I

PHYS 1022  
Introduction to General Physics II
Upper-Level Electives
Four Upper-Level (2000+) elective science courses

College of Science and Technology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTC 1013</td>
<td>Elements of Data Science for the Physical and Life Sciences</td>
<td>3</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>SCTC 2396</td>
<td>Writing for Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>SCTC 3001</td>
<td>History of Science</td>
<td>3</td>
</tr>
<tr>
<td>SCTC 3312</td>
<td>Coding STEM Lessons</td>
<td>1</td>
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</table>

Education

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 2179</td>
<td>Knowing and Learning in Mathematics and Science</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 4388</td>
<td>TTeach Apprentice Teaching</td>
<td>6</td>
</tr>
<tr>
<td>EDUC 4802</td>
<td>TTeach Apprentice Teaching Seminar</td>
<td>1</td>
</tr>
<tr>
<td>MGSE 2189</td>
<td>Classroom Interactions (S)</td>
<td>3</td>
</tr>
<tr>
<td>or SCTC 3485</td>
<td>Science and Mathematics in the Classroom</td>
<td></td>
</tr>
<tr>
<td>MGSE 3796</td>
<td>Differentiated Literacy Instruction in the Disciplines (grades 7-12)</td>
<td>3</td>
</tr>
<tr>
<td>MGSE 4189</td>
<td>Project-Based Instruction (F)</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>SPED 2231</td>
<td>Introduction to Special Education</td>
<td>3</td>
</tr>
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Research Methods

Select one of the following:

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<tbody>
<tr>
<td>BIOL/CHEM/EES/PHYS 3091</td>
<td>Research Methods (S)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: 84-92

(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 TTeach 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 TTeach 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 The four science electives chosen to satisfy the science concentration must be taken from the same department. The departments from which you can choose electives are: Biology, Chemistry, Earth & Environmental Science or Physics. In the circumstance where a laboratory course is the complement of a lecture course, both must be completed to fulfill the requirement for ONE science elective.

3 All students are required to take a minimum of one credit.

4 The course must be selected from the same department as the four science electives.

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 General Science with Teaching, students must:

1. Achieve a 3.50 GPA or better for the aggregate of courses required for the B.S. in General Science with Teaching.

2. Achieve a 3.33 GPA or better in all the content area courses in the major.

3. Complete at least one internship or laboratory project based course.

4. Achieve a 3.90 GPA in the following courses:
### Suggested Academic Plan

**Bachelor of Science in General Science with Teaching**

**Requirements for New Students starting in the 2020-2021 Academic Year**

#### Year 1

**Fall**

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<tr>
<td>SCES 2189</td>
<td>Classroom Interactions</td>
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<tr>
<td>or SCTC 3485</td>
<td>Science and Mathematics in the Classroom</td>
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<td>Project-Based Instruction</td>
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<td>EDUC 4802</td>
<td>TTeach Apprentice Teaching Seminar</td>
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</tr>
<tr>
<td>EDUC 4388</td>
<td>TTeach Apprentice Teaching</td>
<td>6</td>
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</table>

**Select one of the following:**

- CHEM 1031 General Chemistry I
- CHEM 1033
- CHEM 1951 Honors General Chemical Science I (F)
- CHEM 1953

**Select one of the following:**

- MATH 1031 Differential and Integral Calculus
- MATH 1041 Calculus I
- MATH 1941 Honors Calculus I
- SCTC 1001 CST First Year Seminar
- SCTC 1013 Elements of Data Science for the Physical and Life Sciences
- SCTC 1389 Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners
- Elective

**Term Credit Hours**

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>BIOL 1011</td>
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<td>Knowing and Learning in Mathematics and Science</td>
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Select one of the following:

- EES 1001 Introductory Geology
- EES 2001 Physical Geology
- IH 0851 or 0951 Intellectual Heritage I: The Good Life [GY]

**Term Credit Hours**

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
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### Year 3

**Spring**
- BIOL 1012 General Biology II (S) 4
- Science 2000+ Elective 3-4
- MGSE 3796 Differentiated Literacy Instruction in the Disciplines (grades 7-12) [WI] 3
- IH 0852 or 0952 Intellectual Heritage II: The Common Good [GZ] 3
- GenEd Breadth Course 4-3

**Fall**
- PHYS 1021 Introduction to General Physics I 4
- Science 2000+ Elective 3-4
- SCTC 3001 History of Science 3
- SCTC 3312 Coding STEM Lessons 3
- GenEd Breadth Course 3
- Elective 2-1

**Year 4**

**Spring**
- PHYS 1022 Introduction to General Physics II 4
- Select one of the following (S): 3
  - BIOL 3091 Research Methods (S)
  - CHEM 3091 Research Methods (S)
  - PHYS 3091 Research Methods (S)
  - EES 3091 Research Methods (S)
- Select one of the following: 3
  - MGSE 2189 Classroom Interactions (S)
  - SCTC 3485 Science and Mathematics in the Classroom
  - SCTC 2396 Writing for Science and Technology [WI]
- Elective 3

**Fall**
- PHYS 1004 Introduction to Astronomy (F) 3
- Science 2000+ Elective 3-4
- Science 2000+ Elective 3-4
- Select one of the following: 3
  - MGSE 4189 Project-Based Instruction (F)
  - SCTC 4485 Integrating STEM Practice in Diverse Teaching Environments
- GenEd Breadth Course 3
- Elective 2-0

**Spring**
- EDUC 4388 TUteach Apprentice Teaching 6
- EDUC 4802 TUteach Apprentice Teaching Seminar 1
- Elective 3

**Total Credit Hours:** 124
1 Not required if MATH 1031 is completed.

2 The four science electives chosen to satisfy the science concentration must be taken from the same department. The departments from which you can choose electives are: Biology, Chemistry, Earth & Environmental Science or Physics. The Research Methods course must also be selected from the same department as the four electives. In the circumstance where a laboratory course is the complement of a lecture course, both must be completed to fulfill the requirement for ONE science elective.

3 All students are required to take a minimum of one credit.

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<tbody>
<tr>
<td>(F)</td>
<td>Fall only course</td>
<td></td>
</tr>
<tr>
<td>(S)</td>
<td>Spring only course</td>
<td></td>
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