

# General Science and Mathematics with Teaching BS

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## Overview

**NOTE:** Pending the approval of the Department of Education, this program may be available to students sometime during the 2024-2025 academic year. Students should see an advisor to verify that approval has been received prior to attempting to select this program.

The **Bachelor of Science in General Science and Mathematics with Teaching** is part of Temple's innovative "TUteach" secondary education teacher-training program. The BS in General Science and Mathematics with Teaching provides broad training in general science with a mathematics concentration and prepares students for a career in secondary school teaching or an entry technical position. 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 General Science and Mathematics 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 first year must complete the required examinations or acquire the waivers 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-???-BS

## Distinction in Major

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

- achieve a minimum 3.50 major GPA;
- achieve a minimum 3.33 GPA in all the content area courses in the major;
- successful completion of at least one internship or laboratory project based course; and
- achieve a minimum 3.90 GPA in the following courses:
  - SCES 2189 or SCTC 3485
  - SCES 4189 or SCTC 4485
  - EDUC 4802
  - EDUC 4388.

## Undergraduate Contact Information

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These requirements are for students who matriculated in academic year 2024-2025. Students who matriculated prior to fall 2024 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
SCTC 2396	Writing for Science and Technology	3
MGSE 3796	Differentiated Literacy Instruction in the Disciplines (grades 7-12)	3

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:

Code	Title	Credit Hours
BIOL 2297	Research Techniques in Genetics <sup>1</sup>	3
BIOL 3396	Scientific Writing for Biology: The Art of Communicating	3
BIOL 4396	Advanced Study in Biology	3
CHEM 4196	Instrumental Analysis	5
CHEM 3398	Physical Chemistry Laboratory II	2
PHYS 2796	Introduction to Modern Physics (S)	4
PHYS 4796	Experimental Physics (S)	3

- 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 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 (91-95 s.h.)<sup>2</sup>

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. 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
<b>Biology</b>		
Select one of the following:		4
BIOL 1011	General Biology I (F)	
BIOL 1111 or BIOL 1911	Introduction to Organismal Biology Honors Introduction to Organismal Biology	
Select one of the following:		4
BIOL 1012	General Biology II (S)	

BIOL 1112 or BIOL 1912	Introduction to Biomolecules, Cells and Genomes Honors Introduction to Biomolecules, Cells and Genomes	
<b>Chemistry</b>		
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)	
Select one of the following:		4
CHEM 1032 & CHEM 1034	General Chemistry II and General Chemistry Laboratory II	
CHEM 1952 & CHEM 1954	Honors General Chemical Science II and Honors Chemical Science Laboratory II (S)	
<b>Earth &amp; Environmental Science</b>		
EES 1001 or EES 2001	Introductory Geology Physical Geology	4
<b>Mathematics</b>		
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
MATH 1042 or MATH 1942	Calculus II Honors Calculus II	4
Select one of the following:		3-4
MATH 1044	Introduction to Probability and Statistics for the Life Sciences	
MATH 2031	Probability and Statistics	
MATH 2061	Euclidean Geometry	3
Three Mathematics electives at the 2000+ level or above		9-12
<b>Physics</b>		
PHYS 1004	Introduction to Astronomy (F)	3
Select one of the following:		4
PHYS 1021	Introduction to General Physics I	
PHYS 1061 or PHYS 1961	Elementary Classical Physics I Honors Elementary Classical Physics I	
PHYS 2021 or PHYS 2921	General Physics I Honors General Physics I	
Select one of the following:		
PHYS 1022	Introduction to General Physics II	
PHYS 1062 or PHYS 1962	Elementary Classical Physics II Honors Elementary Classical Physics II	
PHYS 2022 or PHYS 2922	General Physics II Honors General Physics II	
<b>Technology Course</b>		
Choose one of the following:		4
CIS 1051 or CIS 1951	Introduction to Problem Solving and Programming in Python Honors Introduction to Problem Solving and Programming in Python	
CIS 1057	Computer Programming in C	
CIS 1068 or CIS 1968	Program Design and Abstraction Honors Program Design and Abstraction	
<b>College of Science and Technology</b>		
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 2396	Writing for Science and Technology	3
SCTC 3001	History of Science	3
SCTC 3312	Coding STEM Lessons <sup>3</sup>	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 or SCTC 3485	Classroom Interactions (S) Science and Mathematics in the Classroom	3
MGSE 3796	Differentiated Literacy Instruction in the Disciplines (grades 7-12)	3
MGSE 4189 or SCTC 4485	Project-Based Instruction (F) Integrating STEM Practice in Diverse Teaching Environments	3
SPED 2231	Introduction to Special Education	3

**Research Methods**

Select one of the following: <sup>4</sup>		3
BIOL/CHEM/EES/PHYS 3091	Research Methods (S)	

**Total Credit Hours** **91-95**

Code	Title	Credit Hours
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(F) - Fall only course

(S) - Spring only course

<sup>1</sup> This course has a co-requisite of BIOL 2207.

<sup>2</sup> 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.

<sup>3</sup> All students are required to take a minimum of one credit.

<sup>4</sup> This course may be selected from one of four Research Methods courses in Biology, Chemistry, EES or Physics numbered 3091.

## Suggested Academic Plan

### Bachelor of Science in General Science and Mathematics with Teaching

#### Suggested Plan for New Students Starting in the 2024-2025 Academic Year

Year 1		Credit Hours
<b>Fall</b>		
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)	
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
<b>Credit Hours</b>		<b>17</b>
<b>Spring</b>		
Select one of the following:		4
CHEM 1032 & CHEM 1034	General Chemistry II and General Chemistry Laboratory II	
CHEM 1952 & CHEM 1954	Honors General Chemical Science II and Honors Chemical Science Laboratory II (S)	

Select one of the following:		4
CIS 1051 or CIS 1951	Introduction to Problem Solving and Programming in Python or Honors Introduction to Problem Solving and Programming in Python	
CIS 1057	Computer Programming in C	
CIS 1068 or CIS 1968	Program Design and Abstraction or Honors Program Design and Abstraction	
MATH 1042 or MATH 1942	Calculus II or Honors Calculus II	4
ENG 0802 or ENG 0812 or ENG 0902	Analytical Reading and Writing [GW] or Analytical Reading and Writing: ESL [GW] or Honors Analytical Reading and Writing [GW]	4

**Credit Hours 16**

**Year 2**

**Fall**

Select one of the following: 4

BIOL 1011	General Biology I (F)	
BIOL 1111 or BIOL 1911	Introduction to Organismal Biology or Honors Introduction to Organismal Biology	

Select one of the following: 3-4

MATH 1044	Introduction to Probability and Statistics for the Life Sciences	
MATH 2031	Probability and Statistics	

SPED 2231 Introduction to Special Education 3

EDUC 2179 Knowing and Learning in Mathematics and Science 3

IH 0851 Intellectual Heritage I: The Good Life [GY] 3

or IH 0951 or Honors Intellectual Heritage I: The Good Life [GY]

Elective 2-0

**Credit Hours 18-17**

**Spring**

Select one of the following: 4

BIOL 1012	General Biology II (S)	
BIOL 1112 or BIOL 1912	Introduction to Biomolecules, Cells and Genomes or Honors Introduction to Biomolecules, Cells and Genomes	

MATH 2061 Euclidean Geometry 3

2000+ Mathematics Elective 3-4

MGSE 3796 Differentiated Literacy Instruction in the Disciplines (grades 7-12) [WI] 3

IH 0852 Intellectual Heritage II: The Common Good [GZ] 3

or IH 0952 or Honors Intellectual Heritage II: The Common Good [GZ]

**Credit Hours 16-17**

**Year 3**

**Fall**

Select one of the following: 4

PHYS 1021	Introduction to General Physics I	
PHYS 1061 or PHYS 1961	Elementary Classical Physics I or Honors Elementary Classical Physics I	
PHYS 2021 or PHYS 2921	General Physics I or Honors General Physics I	

Select one of the following: 4

EES 1001	Introductory Geology	
EES 2001	Physical Geology	

SCTC 3001 History of Science 3

GenEd Breadth Course 3

**Credit Hours 14**

**Spring**

Select one of the following: 4

PHYS 1022	Introduction to General Physics II	
PHYS 1062 or PHYS 1962	Elementary Classical Physics II or Honors Elementary Classical Physics II	
PHYS 2022 or PHYS 2922	General Physics II or Honors General Physics II	
Select one of the following (S): <sup>1</sup>		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]	3
SCTC 3312	Coding STEM Lessons <sup>2</sup>	1
GenEd Breadth Course		3
<b>Credit Hours</b>		<b>17</b>
<b>Year 4</b>		
<b>Fall</b>		
PHYS 1004	Introduction to Astronomy (F)	3
2000+ Mathematics Elective		3-4
2000+ Mathematics 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		3-4
<b>Credit Hours</b>		<b>15-18</b>
<b>Spring</b>		
EDUC 4388	TUteach Apprentice Teaching	4
EDUC 4802	TUteach Apprentice Teaching Seminar	3
Elective		4-1
<b>Credit Hours</b>		<b>11-8</b>
<b>Total Credit Hours</b>		<b>124</b>

<sup>1</sup> This course may be selected from one of four Research Methods courses in Biology, Chemistry, EES or Physics numbered 3091.

<sup>2</sup> All students are required to take a minimum of one credit.

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