

General Science with Teaching BS

Overview

The **Bachelor of Science in General Science with Teaching** is part of Temple's innovative "TUteach" secondary education teacher-training program. The BS in General Science 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 this major include supervised teaching in school district classrooms and emphasize inquiry-based approaches to learning. Students in the BS in General 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-GSTC-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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Learn more about the Bachelor of Science in General 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
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 (S) ¹	3
BIOL 3396	Scientific Writing for Biology: The Art of Communicating	3
BIOL 4396	Advanced Study in Biology	3
CHEM 4196	Techniques of Chemical Measurement II	5
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 (84-92 s.h.)²

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.

Code	Title	Credit Hours
Biology		
BIOL 1011	General Biology I (F)	4
BIOL 1012	General Biology II (S)	4
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)	
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)	

Earth & Environmental Science

EES 1001 or EES 2001	Introductory Geology Physical Geology	4
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Mathematics

Select one of the following: 4-8

MATH 1031	Differential and Integral Calculus	
MATH 1041 & MATH 1042	Calculus I and Calculus II	
MATH 1041 & MATH 1044	Calculus I and Introduction to Probability and Statistics for the Life Sciences	
MATH 1941 & MATH 1942	Honors Calculus I and Honors Calculus II	

Physics

PHYS 1004	Introduction to Astronomy (F)	3
PHYS 1021	Introduction to General Physics I	4
PHYS 1022	Introduction to General Physics II	4

Upper-Level Electives

Four Upper-Level (2000+) elective science courses ³ 12-16

College of Science and 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 2396	Writing for Science and Technology	3
SCTC 3001	History of Science	3
SCTC 3312	Coding STEM Lessons ⁴	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: ⁵ 3

BIOL/CHEM/EES/PHYS 3091	Research Methods (S)	
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Total Credit Hours 84-92

Code	Title	Credit Hours
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(F) - Fall only course

(S) - Spring only course

1

This course has a co-requisite of BIOL 2207.

2

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.

3

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.

4

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

5

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

Suggested Academic Plan

Bachelor of Science in General Science with Teaching

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

Year 1		Credit Hours
Fall		
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
MATH 1031	Differential and Integral Calculus	
MATH 1041	Calculus I	
MATH 1941	Honors Calculus I	
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
Elective		2
Credit Hours		16
Spring		
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: ¹		0-4
MATH 1044	Introduction to Probability and Statistics for the Life Sciences	
MATH 1042	Calculus II	
MATH 1942	Honors Calculus II	
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		4-0
Credit Hours		15

Year 2		
Fall		
BIOL 1011	General Biology I (F)	4
SPED 2231	Introduction to Special Education	3
EDUC 2179	Knowing and Learning in Mathematics and Science	3
Select one of the following:		4
EES 1001	Introductory Geology	
EES 2001	Physical Geology	
IH 0851 or IH 0951	Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life	3
Credit Hours		17
Spring		
BIOL 1012	General Biology II (S)	4
Science 2000+ Elective ²		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
GenEd Breadth Course		4-3
Credit Hours		17
Year 3		
Fall		
PHYS 1021	Introduction to General Physics I	4
Science 2000+ Elective ²		3-4
SCTC 3001	History of Science	3
SCTC 3312	Coding STEM Lessons ³	1
GenEd Breadth Course		3
Elective		2-1
Credit Hours		16
Spring		
PHYS 1022	Introduction to General Physics II	4
Select one of the following (S): ²		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	3
Elective		3
Credit Hours		16
Year 4		
Fall		
PHYS 1004	Introduction to Astronomy (F)	3
Science 2000+ Elective ²		3-4
Science 2000+ Elective ²		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
Credit Hours		17

Spring			
EDUC 4388	TUteach Apprentice Teaching		4
EDUC 4802	TUteach Apprentice Teaching Seminar		3
Elective			3
Credit Hours			10
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.

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