

General Science & Technology with Teaching, B.S.

NOTE: Pending the approval of the Department of Education, this program may be available to students sometime during the 2022-2023 academic year. Students should see an advisor to verify that approval has been received prior to attempting to select this program.

The B.S. with Teaching in General Science and Technology 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.

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Summary of Requirements for the Degree

1. University Requirements (124 total s.h.)
 - Students must complete all University requirements including those listed below.
 - All Temple students must take a minimum of two writing-intensive courses 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 2296	Genetics (S)	4
BIOL 3096	Cell Structure and Function (F)	4
BIOL 3396	Scientific Writing for Biology: The Art of Communicating	3
CHEM 4196	Techniques of Chemical Measurement II	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

- 45 Upper Level (2000+) credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA) or the College of Engineering (ENG).
- 90 credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA) or the College of Engineering (ENG).
- All students in the College of Science and Technology are required to take a one credit first year seminar. SCTC 1001 CST First Year Seminar is the appropriate course option for every entering first year CST major. Transfer students should use SCTC 2001 CST Transfer Seminar to fulfill this requirement. Other courses that fulfill this requirement may be found on the CST College Requirements page.

3. Major Requirements for Bachelor of Science (92-96 s.h.)¹

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
Mathematics		
Select one of the following:		4-8
MATH 1031	Differential and Integral Calculus	
MATH 1041 & MATH 1042	Calculus I and Calculus II ²	
MATH 1041 & MATH 1044	Calculus I and Introduction to Probability and Statistics for the Life Sciences ²	

MATH 1941 & MATH 1942	Honors Calculus I and Honors Calculus II ²	
Physics		
PHYS 1004	Introduction to Astronomy (F)	3
PHYS 1021	Introduction to General Physics I	4
PHYS 1022	Introduction to General Physics II	4
Technology Concentration Courses		
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	4
CIS 1166 or CIS 1966	Mathematical Concepts in Computing I Honors Mathematical Concepts in Computing I	4
CIS 2109	Database Management Systems	4
CIS 2168	Data Structures	4
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 ³	1
Education		
EDUC 2179	Knowing and Learning in Mathematics and Science	3
EDUC 4388	TUteach Apprentice Teaching	6
EDUC 4802	TUteach Apprentice Teaching Seminar	1
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: ⁴		3
BIOL/CHEM/EES/PHYS 3091	Research Methods (S)	

Total Credit Hours **92-96**

Code	Title	Credit Hours
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(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 These courses are not required if MATH 1031 is completed.

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

⁴ 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 & Technology with Teaching

Requirements for New Students starting in the 2022-2023 Academic Year

Year 1		Credit Hours
Fall		
Select one of the following:		4
CHEM 1031 & CHEM 1033	General Chemistry I	
CHEM 1951 & CHEM 1953	Honors General Chemical Science I (F)	
Select one of the following: ¹		4
MATH 1031	Differential and Integral Calculus	
MATH 1041 or 1941	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
GenEd Breadth Course		3
Term Credit Hours		17
Spring		
Select one of the following:		4
CHEM 1032 & CHEM 1034	General Chemistry II	
CHEM 1952 & CHEM 1954	Honors General Chemical Science II (S)	
Select one of the following:		4
CIS 1051 or 1951	Introduction to Problem Solving and Programming in Python	
CIS 1057	Computer Programming in C	
Select one of the following:		0-4
MATH 1042 or 1942	Calculus II ²	
MATH 1044	Introduction to Probability and Statistics for the Life Sciences ²	
ENG 0802, 0812, or 0902	Analytical Reading and Writing [GW]	4
Elective		3-0
Term Credit Hours		15-16
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 0951	Intellectual Heritage I: The Good Life [GY]	3
Term Credit Hours		17
Spring		
BIOL 1012	General Biology II (S)	4
Technology Concentration Course		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		3
Term Credit Hours		17

Year 3		
Fall		
PHYS 1021	Introduction to General Physics I	4
	Technology Concentration Course	4
SCTC 3001	History of Science	3
SCTC 3312	Coding STEM Lessons ³	1
	GenEd Breadth Course	3
Term Credit Hours		15
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 [WI]	3
	GenEd Breadth Course	3
Term Credit Hours		16
Year 4		
Fall		
PHYS 1004	Introduction to Astronomy (F)	3
	Technology Concentration Course	4
	Technology Concentration Course	4
	Select one of the following:	3
MGSE 4189	Project-Based Instruction (F)	
SCTC 4485	Integrating STEM Practice in Diverse Teaching Environments	
	Elective	3-2
Term Credit Hours		17-16
Spring		
EDUC 4388	TUteach Apprentice Teaching	6
EDUC 4802	TUteach Apprentice Teaching Seminar	1
	Elective	3
Term Credit Hours		10
Total Credit Hours:		124

¹ General Science and Technology with Teaching majors are required to have completed MATH 1022. They can then elect to take MATH 1031, MATH 1041 or MATH 1941. Note: Students who elect to take MATH 1031 will not need to take the second course in the MATH 1041 or MATH 1941 sequence.

² Not required if MATH 1031 is completed.

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

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