

Physics with Teaching BS

Overview

The **Bachelor of Science in Physics with Teaching**, offered by the Department of Physics, is part of Temple's innovative "TUteach" teacher-training program. The BS in Physics with Teaching provides broad training in physics and prepares students for a career in secondary school teaching or an entry level position as a physicist. The education courses in major include supervised teaching in school district classrooms and emphasize inquiry-based approaches to learning. Students in the BS in Physics 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-PHTC-BS

Distinction in Major

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

- achieve a minimum 3.5 major GPA;
- achieve a minimum 3.5 GPA in all Physics courses required for the major;
- achieve a minimum 3.9 GPA in the following courses:
 - SCES 2189 or SCTC 3485
 - SCES 4189 or SCTC 4485
 - EDUC 4802
 - EDUC 4388;
- write a final research paper either in a topic combining both major content and pedagogy; and
- present at a departmental research poster session.

Consult the undergraduate TUteach advisor for more details.

Undergraduate Contact Information

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Learn more about the Bachelor of Science in Physics 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
EES 2096	Climate Change: Oceans To Atmosphere	
EES 4696	Vertebrate Paleontology and Taphonomy	
PHYS 2796	Introduction to Modern Physics	
PHYS 4796	Experimental Physics	
MGSE 3796	Differentiated Literacy Instruction in the Disciplines (grades 7-12)	

- Students must complete the General Education (GenEd) requirements.
 - See the General Education section of the *Undergraduate Bulletin* for the GenEd curriculum.
 - Students who complete TTeach 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 (90 s.h.)¹

At least 9 courses required for the major must be completed at Temple. At least 6 Physics 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.

Code	Title	Credit Hours
Mathematics		
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
MATH 1042 or MATH 1942	Calculus II Honors Calculus II	4
MATH 2043 or MATH 2943	Calculus III Honors Calculus III	4
Physics		
PHYS 1008	Physics Seminar I	1
PHYS 1061	Elementary Classical Physics I	4

or PHYS 1961	Honors Elementary Classical Physics I	
or PHYS 2021	General Physics I	
or PHYS 2921	Honors General Physics I	
PHYS 1062	Elementary Classical Physics II	4
or PHYS 1962	Honors Elementary Classical Physics II	
or PHYS 2022	General Physics II	
or PHYS 2922	Honors General Physics II	
PHYS 2101	Classical Mechanics	3
PHYS 2502	Mathematical Physics	4
PHYS 2796	Introduction to Modern Physics	4
PHYS 3091	Research Methods	3
PHYS 3301	Electricity and Magnetism	4
PHYS 4796	Experimental Physics	3
Physics Electives - Select three of the following:		9
PHYS 1004	Introduction to Astronomy	
PHYS 2511 & PHYS 3511	Scientific Computing I and Scientific Computing II	
PHYS 3101	Analytical Mechanics	
PHYS 3302	Classical Electromagnetism	
PHYS 3701	Introduction to Quantum Mechanics I	
PHYS 4101	Thermal Physics	
PHYS 4301	Electronics	
PHYS 4302	Optics	
PHYS 4701	Introduction to Solid State Physics	
PHYS 4702	Introduction to Quantum Mechanics II	
Sequenced Science courses ²		
Select one of the following sequences:		8
BIOL 1011 & BIOL 1012	General Biology I and General Biology II	
BIOL 1111 & BIOL 2112	Introduction to Organismal Biology and Introduction to Cellular and Molecular Biology	
CHEM 1031 & CHEM 1033 & CHEM 1032 & CHEM 1034	General Chemistry I and General Chemistry Laboratory I and General Chemistry II and General Chemistry Laboratory II	
EES 2001	Physical Geology (and an Earth & Environmental Science 2002+ Elective)	
College of Science & 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 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	4
EDUC 4802	TUteach Apprentice Teaching Seminar	3
MGSE 2189	Classroom Interactions (S)	3
or SCTC 3485	Science and Mathematics in the Classroom	
MGSE 3796	Differentiated Literacy Instruction in the Disciplines (grades 7-12)	3
MGSE 4189	Project-Based Instruction (F)	3
or SCTC 4485	Integrating STEM Practice in Diverse Teaching Environments	
SPED 2231	Introduction to Special Education	3
Total Credit Hours		90

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

Students are required to take a two-semester sequence of laboratory science electives not within physics. The science courses can be chosen from Biology, Chemistry or Earth & Environmental Science.

3

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

Suggested Academic Plan

Bachelor of Science in Physics with Teaching

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

Year 1		Credit Hours
Fall		
MATH 1041 or MATH 1941	Calculus I or Honors Calculus I	4
PHYS 1008	Physics Seminar I	1
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)	
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
Credit Hours		15
Spring		
MATH 1042 or MATH 1942	Calculus II or Honors Calculus II	4
Select one of the following:		4
PHYS 1062	Elementary Classical Physics II	
PHYS 1962	Honors Elementary Classical Physics II (S)	
PHYS 2022	General Physics II	
PHYS 2922	Honors General Physics II (S)	
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		2
Credit Hours		17
Year 2		
Fall		
MATH 2043 or MATH 2943	Calculus III or Honors Calculus III	4
EDUC 2179	Knowing and Learning in Mathematics and Science	3
SPED 2231	Introduction to Special Education	3
IH 0851 or IH 0951	Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life	3

GenEd Breadth Course		3
Credit Hours		16
Spring		
PHYS 2101	Classical Mechanics (S)	3
PHYS 2502	Mathematical Physics (S)	4
PHYS 2796	Introduction to Modern Physics (S)	4
IH 0852 or IH 0952	Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good	3
GenEd Breadth Course		3
Credit Hours		17
Year 3		
Fall		
PHYS 3301	Electricity and Magnetism (F)	4
Physics Elective (see approved list) ¹		3
Sequenced Science Part 1 (see approved list) ²		4
SCTC 3001	History of Science	3
MGSE 3796	Differentiated Literacy Instruction in the Disciplines (grades 7-12)	3
Credit Hours		17
Spring		
Physics Elective (see approved list) ¹		3
PHYS 3091	Research Methods (S)	3
PHYS 4796	Experimental Physics (S)	3
Select one of the following:		3
MGSE 2189	Classroom Interactions (S)	
SCTC 3485	Science and Mathematics in the Classroom	
Elective		3
Credit Hours		15
Year 4		
Fall		
Physics Elective (see approved list) ¹		3
Sequenced Science Part 2 (see approved list) ²		4
SCTC 3312	Coding STEM Lessons ³	1
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
Elective		3-2
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
Code	Title	Credit Hours

(F) - Fall only course

(S) - Spring only course

1

Students are required to take three advanced physics electives selected from the list in the requirements section.

2

Students are required to take a two-semester sequence of laboratory science electives not within physics. The science courses can be chosen from Biology, Chemistry or Earth & Environmental Science from the list in the requirements section.

3

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