

# Chemistry with Teaching, B.S.

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The B.S. with Teaching in Chemistry is part of Temple's innovative "TUteach" secondary education teacher-training program. The B.S. with Teaching provides broad training in Chemistry, and prepares students for a career in secondary school teaching. 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 insure 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. Finally, students are encouraged to complete the appropriate PRAXIS II examination prior to student teaching.

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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. Following is a list of courses that can be used to satisfy the writing-intensive requirement:

CHEM 4196	Techniques of Chemical Measurement II
CHEM 3397 & CHEM 3398	Physical Chemistry Laboratory I and Physical Chemistry Laboratory II
PHIL 2196	Perspectives on Science and Mathematics
SECE 3796	Differentiated Literacy Instruction in the Disciplines, 7-12

- Students must complete the General Education (GenEd) requirements.
    - See the General Education (<http://bulletin.temple.edu/undergraduate/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 (<http://bulletin.temple.edu/undergraduate/academic-policies/academic-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).

3. Major Requirements for Bachelor of Science (84-85 s.h.)<sup>1</sup>

At least 9 courses required for the major must be completed at Temple. At least 5 Chemistry 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.

**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)

Select one of the following: 4

CHEM 2201 & CHEM 2203	Organic Chemistry I and Organic Chemistry Laboratory I
CHEM 2211 & CHEM 2213	Organic Chemistry for Majors I and Organic Majors Laboratory I (F)
CHEM 2921 & CHEM 2923	Organic Chemistry for Honors I and Organic Honors Laboratory I (F)

Select one of the following: 4

CHEM 2202 & CHEM 2204	Organic Chemistry II and Organic Chemistry Laboratory II
CHEM 2212 & CHEM 2214	Organic Chemistry for Majors II and Organic Majors Laboratory II (S)
CHEM 2922 & CHEM 2924	Organic Chemistry for Honors II and Organic Honors Laboratory II (S)

CHEM 3091 Research Methods (S) 3

CHEM 3103 Techniques of Chemical Measurement I 4  
& CHEM 3105 and Introduction to Chemical Research Techniques

CHEM 3001 Inorganic Chemistry 3

CHEM 3301 Physical Chemistry Lecture I 3

CHEM 3302 Physical Chemistry Lecture II 3

Select one of the following: 4-5

CHEM 4196	Techniques of Chemical Measurement II	
CHEM 3397 & CHEM 3398	Physical Chemistry Laboratory I and Physical Chemistry Laboratory II	
<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
MATH 2043 or MATH 2943	Calculus III Honors Calculus III	4
<b>Physics</b>		
PHYS 1061 or PHYS 1961 or PHYS 2021 or PHYS 2921	Elementary Classical Physics I Honors Elementary Classical Physics I General Physics I Honors General Physics I	4
PHYS 1062 or PHYS 1962 or PHYS 2022 or PHYS 2922	Elementary Classical Physics II Honors Elementary Classical Physics II General Physics II Honors General Physics II	4
<b>College of Science &amp; Technology</b>		
SCTC 1389	Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners	2
SCTC 3312	Coding STEM Lessons <sup>2</sup>	1
<b>Education</b>		
EDUC 2179	Knowing and Learning in Mathematics and Science	3
EDUC 4388	TUteach Apprentice Teaching	6
EDUC 4802	TUteach Apprentice Teaching Seminar	1
SCES 2189 or SCTC 3485	Classroom Interactions (S) Science and Mathematics in the Classroom	3
SCES 4189 or SCTC 4485	Project-Based Instruction (F) Integrating STEM Practice in Diverse Teaching Environments	3
SECE 3796	Differentiated Literacy Instruction in the Disciplines, 7-12	3
SPED 2231	Introduction to Inclusive Education	3
<b>Philosophy/History</b>		
Select one of the following:		3
PHIL 2196	Perspectives on Science and Mathematics	
SCTC 3001	History of Science	

Total Credit Hours 84-85

(F) - Fall only course

(S) - Spring only course

<sup>1</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 (<http://cst.temple.edu/academics/accelerated-programs/tuteach>). 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>2</sup> All students are required to complete a minimum of one credit.

## 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 Chemistry with Teaching, students must meet the following requirements:

1. Achieve a 3.50 GPA or better for the aggregate of courses required for the B.S. in Chemistry with Teaching.
2. Achieve a 3.33 GPA or better in all the Chemistry courses in their major.
3. Achieve a 3.90 GPA in the following courses:

SCES 2189 or SCTC 3485	Classroom Interactions Science and Mathematics in the Classroom	3
SCES 4189 or SCTC 4485	Project-Based Instruction Integrating STEM Practice in Diverse Teaching Environments	3
EDUC 4802	TUteach Apprentice Teaching Seminar	1
EDUC 4388	TUteach Apprentice Teaching	6

## Suggested Academic Plan

### Bachelor of Science in Chemistry with Teaching

#### Requirements for New Students starting in the 2017-2018 Academic Year

Year 1		Credit Hours
<b>Fall</b>		
Select one of the following:		4
CHEM 1031 & CHEM 1033	General Chemistry I	
CHEM 1951 & CHEM 1953	Honors General Chemical Science I (F)	
MATH 1041 or 1941	Calculus I	4
SCTC 1389	Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners	2
General Education/Elective Credits		7
Term Credit Hours		17
<b>Spring</b>		
Select one of the following:		4
CHEM 1032 & CHEM 1034	General Chemistry II	
CHEM 1952 & CHEM 1954	Honors General Chemical Science II (S)	
MATH 1042 or 1942	Calculus II	4
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)	
SPED 2231	Introduction to Inclusive Education	3
Term Credit Hours		15
<b>Year 2</b>		
<b>Fall</b>		
Select one of the following:		4
CHEM 2201 & CHEM 2203	Organic Chemistry I	
CHEM 2211 & CHEM 2213	Organic Chemistry for Majors I (F)	
CHEM 2921 & CHEM 2923	Organic Chemistry for Honors I (F)	

MATH 2043 or 2943	Calculus III	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)	
EDUC 2179	Knowing and Learning in Mathematics and Science	3
General Education/Elective Credits		1
	Term Credit Hours	16

**Spring**

Select one of the following:		4
CHEM 2202 & CHEM 2204	Organic Chemistry II	
CHEM 2212 & CHEM 2214	Organic Chemistry for Majors II (S)	
CHEM 2922 & CHEM 2924	Organic Chemistry for Honors II (S)	
SECE 3796	Differentiated Literacy Instruction in the Disciplines, 7-12 [WI]	3
General Education/Elective Credits		10
	Term Credit Hours	17

**Year 3****Fall**

CHEM 3103	Techniques of Chemical Measurement I	3
CHEM 3105	Introduction to Chemical Research Techniques	1
CHEM 3301	Physical Chemistry Lecture I	3
Select one of the following:		3
PHIL 2196	Perspectives on Science and Mathematics [WI]	
SCTC 3001	History of Science	
General Education/Elective Credits		7
	Term Credit Hours	17

**Spring**

CHEM 3001	Inorganic Chemistry	3
CHEM 3091	Research Methods (S)	3
CHEM 3302	Physical Chemistry Lecture II	3
Select one of the following:		3
SCES 2189	Classroom Interactions (S)	
SCTC 3485	Science and Mathematics in the Classroom	
General Education/Elective Credits		5
	Term Credit Hours	17

**Year 4****Fall**

Select one of the following:		4-5
CHEM 4196	Techniques of Chemical Measurement II [WI]	
CHEM 3397 & CHEM 3398	Physical Chemistry Laboratory I [WI]	
Select one of the following:		3
SCES 4189	Project-Based Instruction (F)	
SCTC 4485	Integrating STEM Practice in Diverse Teaching Environments	
SCTC 3312	Coding STEM Lessons <sup>1</sup>	1
General Education/Elective Credits		9-8
	Term Credit Hours	17

**Spring**

EDUC 4388	TUteach Apprenticeship Teaching	6
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EDUC 4802	TUteach Apprentice Teaching Seminar	1
General Education/Elective Credits		1
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Term Credit Hours		8
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Total Credit Hours:		124

<sup>1</sup> All students are required to complete a minimum of one credit.

(F) - Fall only course

(S) - Spring only course