Chemistry, Teaching (BSCh)

Total Hours Required: 120

Plan of Study

The Plan of Study is a suggested four-year course sequence to support academic planning and serves as a helpful guide. Currently enrolled students should meet with their academic advisor to tailor their course selections and timelines to their individual goals and circumstances.

Course	Title	Hours
Year 1		
Semester 1		
CH 301C	Foundations of Chemistry I	3
M 408C	Differential and Integral Calculus	4
UTS 101	Secondary Teacher Education Preparation: Step 1	1
Visual and Performing Arts (050)		3
First-Year Signature Course (090)		3
	Hours	**14**
Semester 2		
CH 302C	Foundations of Chemistry II	3
CH 204	Introduction to Chemical Practice	2
M 408D	Sequences, Series, and Multivariable Calculus	4
UTS 110	Secondary Teacher Education Preparation: STEP 2	1
Social and Behavioral Sciences (080)		3
Free Elective		4
	Hours	**17**
Year 2		
Semester 1		
CH 320M	Organic Chemistry I	3
PHY 301	Mechanics	3
&		
PHY 101L	Laboratory for Physics 301	1
M 427J	Differential Equations with Linear Algebra	4
RHE 306	Rhetoric and Writing	3
EDC 365C	Knowing and Learning in Math and Science	3
	Hours	**17**
Semester 2		
CH 320N	Organic Chemistry II	3
&		
CH 220C	Organic Chemistry Laboratory	2
PHY 316	Electricity and Magnetism	3
&		
PHY 116L	Laboratory for Physics 316	1
M 427L	Advanced Calculus for Applications II	4
EDC 365D	Classroom Interactions	3
	Hours	**16**
Year 3		
Semester 1		
CH 353	Physical Chemistry I	3
BCH 339F	Foundations of Biochemistry	3
PHY 315	Wave Motion and Optics	3
&		
PHY 115L	Laboratory for Physics 315	1
HIS 329U	Perspectives on Science and Mathematics	3
Humanities (040)		3
	Hours	**16**
Semester 2		
CH 153K	Physical Chemistry Laboratory	1
CH 368	Advanced Topics in Chemistry	3
CH 354	Quantum Chemistry and Spectroscopy	3
Hours chosen from: Upper-division physics		3
American and Texas Government (070)		3
	Hours	**13**
Year 4		
Semester 1		
CH 354C	Statistical Mechanics	3
CH 154K	Physical Chemistry Laboratory	1
CH 455	Fundamentals of Analytical Chemistry	4
EDC 365E	Project-Based Instruction	3
U.S. History (060)		3
	Hours	**14**
Semester 2		
EDC 651S	Topics in Secondary School Teaching Practicum	6
UTS 170	Student Teaching Seminar	1
American and Texas Government (070)		3
U.S. History (060)		3
	Hours	**13**
	Total Hours	**120**

Requirements

All requirements are listed below, starting with the most specialized moving to the most general. Additional requirements may follow the table, so be sure to read the entire page. Some required courses listed below may also satisfy General Education requirements, including Core Curriculum.

Code	Title	Hours
Concentration		
Hours chosen from:		8
M 408C	Differential and Integral Calculus	
&		
M 408D	Sequences, Series, and Multivariable Calculus	
M 408N	Differential Calculus for Science	
&		
M 408S	Integral Calculus for Science	
&		
M 308M	Multivariable Calculus	
HIS 329U	Perspectives on Science and Mathematics	3
or PHL 329U	Perspectives on Science and Mathematics	
Hours chosen from: One of the following certification areas (see course lists):		18
Composite science certification		
Physical sciences certification		
Mathematics, physical science, and engineering certification		
Middle grade certification		
Professional development coursework:		18
EDC 651S.4	Secondary School Teaching Practicum: Science	
EDC 365C	Knowing and Learning in Math and Science	
or UTS 350	Knowing and Learning in Math and Science	
EDC 365D	Classroom Interactions	
or UTS 355	Classroom Interactions	
EDC 365E	Project-Based Instruction	
or UTS 360	Project-Based Instruction	
UTS 101	Secondary Teacher Education Preparation: Step 1	
UTS 110	Secondary Teacher Education Preparation: STEP 2	
UTS 170	Student Teaching Seminar	
Subtotal		*47*
Degree (see details below)		**31**
Free electives: Additional coursework to reach total hours required.		0

Subtotal	*31*
General Education	
Core Curriculum	42
Foreign Language other than English, Beginning Proficiency	
Subtotal	*42*
College Requirements - Natural Sciences	
General University Requirements	
Total Hours	**120**

Degree-Bachelor of Science in Chemistry (BSCh)

Six degree plans lead to the Bachelor of Science in Chemistry. Chemical Physics & Instrumentation, Molecular Theory & Simulation, Materials Chemistry, and Synthesis & Chemical Biology are intended to prepare students for professional careers, either upon graduation or after graduate study in chemistry or related fields. Teaching is intended to prepare students to enter the teaching profession. Chemistry Honors is intended to prepare students for academic or research careers. Students who plan to follow Chemistry Honors must be admitted to the Dean's Scholars, Health Science Scholars, or Polymathic Scholars Honors Program.

The six degree plans may also serve as the basis for work in many areas outside pure chemistry, such as materials science, medicine and other health-related fields, pharmacology, patent law, business, computation, or environmental science. Supporting work in mathematics and physics is an integral part of the degree programs. Compared to the program leading to the bachelor of science and arts degree, the Bachelor of Science in Chemistry degree programs are more thorough and demanding and potentially more rewarding to the student planning a career in chemistry.

Code	Title	Hours
Degree		
Choose a sequence below:		8
Sequence 1:		
M 408C	Differential and Integral Calculus	
M 408D	Sequences, Series, and Multivariable Calculus	
Sequence 2:		
M 408N	Differential Calculus for Science	
M 408S	Integral Calculus for Science	
M 408M	Multivariable Calculus	
M 427J	Differential Equations with Linear Algebra	4
SDS 320E	Elements of Statistics	3
Choose a sequence below:		8
Sequence 1:		
PHY 301	Mechanics	
PHY 101L	Laboratory for Physics 301	
PHY 316	Electricity and Magnetism	
PHY 116L	Laboratory for Physics 316	
Sequence 2:		
PHY 303K	Engineering Physics I	
PHY 105M	Laboratory For Physics 302K, 303K, and 317K	
PHY 303L	Engineering Physics II	
PHY 105N	Laboratory For Physics 302L, 303L, and 317L	
CH 401	Principles of Chemistry I	4
or CH 401C	Foundations of Chemistry I	
Choose a sequence below:		4
Sequence 1:		
CH 402	Principles of Chemistry II	
Sequence 2:		
CH 402C	Foundations of Chemistry II	
Sequence 3:		
CH 302	Principles of Chemistry II	
CH 204	Introduction to Chemical Practice	
Sequence 4:		
CH 302C	Foundations of Chemistry II	
CH 204	Introduction to Chemical Practice	
Choose a sequence below:		8
Sequence 1:		
CH 328C	Structure and Reactivity of Organic Molecules I	
CH 329C	Structure and Reactivity of Organic Molecules II	
CH 128K	Organic Chemistry Laboratory	
CH 128L	Organic Chemistry Laboratory	
Sequence 2:		
CH 320M	Organic Chemistry I	
CH 320N	Organic Chemistry II	
CH 220C	Organic Chemistry Laboratory	
Sequence 3:		
CH 328M	Organic Chemistry I	
CH 328N	Organic Chemistry II	
CH 128K	Organic Chemistry Laboratory	
CH 128L	Organic Chemistry Laboratory	
CH 119C	Professional Development for Chemists	1
CH 353	Physical Chemistry I	3
or CH 353M	Physical Chemistry I for Life Sciences	
CH 153K	Physical Chemistry Laboratory	1
CH 354	Quantum Chemistry and Spectroscopy	3
All students must complete at least 36 semester hours of upper-division coursework; at least 21 semester hours of upper-division coursework in chemistry must be completed in residence at the University.		
Total Hours		**47**

Additional Requirements and Policies

Students in all concentrations must fulfill both the University's General Requirements for graduation and the college requirements. They must also earn a grade of at least *C-* in each mathematics and science course required for the degree, and a University grade point average in these courses of at least 2.00. More information about grades and the grade point average is given in the General Information Catalog.

Order and Choice of Work

Students begin the Bachelor of Science in Chemistry degree program with eight or nine hours of introductory chemistry for science majors (CH 401 or CH 401C, and CH 402, CH 402C, or CH 302 and CH 204), as well as M 408C or M 408N. Students should consult with their academic advisors about planning to choose a chemistry degree focus area, appropriate course in mathematics and physical sciences, and about course load and balance between laboratory and lecture courses. Most students will select a degree focus area by the end of the second year and take at least 21 hours of upper-division coursework in the major requirements in the third and fourth years.

E S 301; and M E 377K upon approval of the project by the UTeach Program.

Additional Requirements and Policies

- To graduate and be recommended for certification, students who follow the teaching focus area must have a University grade point average of at least 2.50.
- Students must earn a grade of at least *C-* in the supporting course: History 329U or Philosophy 329U
- Students must earn a grade of at least *C-* following professional development courses and must pass the final teaching portfolio review:
  - Curriculum and Instruction 651S (Topic 4: *Secondary School Teaching Practicum: Science*)
  - Curriculum and Instruction 365C or UTeach-Natural Sciences 350
  - Curriculum and Instruction 365D or UTeach-Natural Sciences 355
  - Curriculum and Instruction 365E or UTeach-Natural Sciences 360
  - UTeach-Natural Sciences 101, 110, and 170
- Students seeking middle grades certification must earn a grade of at least *C-* in each of the following courses: Educational Psychology 350G or Psychology 301 and 304; and Curriculum and Instruction 339E
- For information about the portfolio review and additional teacher certification requirements, consult the UTeach-Natural Sciences academic advisor.

This concentration area is designed to fulfill the course requirements for certification as a middle grade or secondary school science teacher in Texas. Students choose one of the following areas: composite science certification with chemistry as the primary teaching field; physical sciences certification; or physical science, mathematics, and engineering certification. However, completion of the course requirements does not guarantee the student's certification. Information about additional teacher certification requirements is available from the UTeach-Natural Sciences academic advisor.

Composite Science Certification

Code	Title	Hours
Hours chosen from:		8
PHY X01 & PHY X01L & PHY X16 & PHY X16L	Mechanics and Laboratory for Physics 301 and Electricity and Magnetism and Laboratory for Physics 316 (Science 365 and Physics 108 may substitute for Physics 316 and Physics 116L, Physics 317L and Physics 105N, or Physics 303L and Physics 105N. Physics 108 is offered on the pass/fail basis.)	
PHY X03K & PHY X05M & PHY X03L & PHY X05N	Engineering Physics I and Laboratory For Physics 302K, 303K, and 317K and Engineering Physics II and Laboratory For Physics 302L, 303L, and 317L (Science 365 and Physics 108 may substitute for Physics 316 and Physics 116L, Physics 317L and Physics 105N, or Physics 303L and Physics 105N. Physics 108 is offered on the pass/fail basis.)	
PHY X17K & PHY X05M & PHY X17L & PHY X05N	General Physics I and Laboratory For Physics 302K, 303K, and 317K and General Physics II and Laboratory For Physics 302L, 303L, and 317L (Science 365 and Physics 108 may substitute for Physics 316 and Physics 116L, Physics 317L and Physics 105N, or Physics 303L and Physics 105N. Physics 108 is offered on the pass/fail basis.)	
BIO 311C	Introductory Biology I	3
Hours chosen from:		3
GEO 401	Physical Geology	
GEO 303	Introduction to Geology	
GEO 302C	Climate: Past, Present, and Future	
GEO 302E	Earth, Wind, and Fire	
GEO 302G	Earth Science and Sustainability	
GEO 302M	The Age of Mammals	
GEO 302N	Geology of National Parks	
GEO 303E	Earth in 2100	
GEO 302J	Crisis of Our Planet	
GEO 302T	Climate and the Energy Transition	
Hours chosen from: Approved coursework in biology, geological sciences, or physics to provide the required 12 hours in a second field		
Hours chosen from:		3
CH 368.1	Research Methods: UTeach (Topic 1: Research Methods: UTeach)	
An upper-division chemistry course that includes a substantial research component (with the consent of the UTeach-Natural Sciences academic advisor)		
The following courses can count in place of Chemistry 119, Chemistry 353 or 353M, 153K, and 354 for a total of at least 34 semester hours of chemistry:		
BCH 339F	Foundations of Biochemistry	3
or BCH 369	Fundamentals of Biochemistry	
CH 353	Physical Chemistry I	3
CH 455	Fundamentals of Analytical Chemistry	4
or CH 456	Analytical Chemistry	
Total Hours		**27**

Physical Sciences Certification

Code	Title	Hours
Select one of the following:		12
PHY X01 & PHY X01L & PHY X16 & PHY X16L & PHY X15 & PHY X15L	Mechanics and Laboratory for Physics 301 and Electricity and Magnetism and Laboratory for Physics 316 and Wave Motion and Optics and Laboratory for Physics 315	
PHY X03K & PHY X05M & PHY X03L & PHY X05N & PHY X15 & PHY X15L	Engineering Physics I and Laboratory For Physics 302K, 303K, and 317K and Engineering Physics II and Laboratory For Physics 302L, 303L, and 317L and Wave Motion and Optics and Laboratory for Physics 315	
CH 153K	Physical Chemistry Laboratory	1
CH 354C	Statistical Mechanics	3
CH 154K	Physical Chemistry Laboratory	1

CH 354	Quantum Chemistry and Spectroscopy	3
Hours chosen from: Upper-division coursework in physics		3
Hours chosen from:		3
CH 368	Advanced Topics in Chemistry	
Hours chosen from: Upper-division chemistry course that includes a substantial research component (with the consent of the UTeach-Natural Sciences academic advisor)		
The following courses can count in place of Chemistry 119, Chemistry 353 or 353M, 153K, and 354 for a total of at least 34 semester hours of chemistry:		
BCH 339F	Foundations of Biochemistry	3
or BCH 369	Fundamentals of Biochemistry	
CH 353	Physical Chemistry I	3
CH 455	Fundamentals of Analytical Chemistry	4
or CH 456	Analytical Chemistry	
Total Hours		**36**

Mathematics, Physical Science, and Engineering Certification

Code	Title	Hours
Hours chosen from:		12
PHY X01 & PHY X01L & PHY X16 & PHY X16L & PHY X15 & PHY X15L	Mechanics and Laboratory for Physics 301 and Electricity and Magnetism and Laboratory for Physics 316 and Wave Motion and Optics and Laboratory for Physics 315	
PHY X03K & PHY X05M & PHY X03L & PHY X05N & PHY X15 & PHY X15L	Engineering Physics I and Laboratory For Physics 302K, 303K, and 317K and Engineering Physics II and Laboratory For Physics 302L, 303L, and 317L and Wave Motion and Optics and Laboratory for Physics 315	
M 315C	Foundations, Functions, and Regression Models	3
M 375D	Discovery: An Introduction to Advanced Study in Mathematics	3
M 427J	Differential Equations with Linear Algebra	4
or M 427K	Advanced Calculus for Applications I	
M 333L	Structure of Modern Geometry	3
E S 301	Engineering Design and Problem Solving	3
M E 377K	Projects in Mechanical Engineering (upon approval of the project by the UTeach Program)	3
Hours chosen from:		3
CH 368.1	Research Methods: UTeach (Topic 1: Research Methods: UTeach)	
An upper-division chemistry course that includes a substantial research component (with the consent of the UTeach-Natural Sciences academic advisor)		
The following courses can count in place of Chemistry 119, Chemistry 353 or 353M, 153K, and 354 for a total of at least 30 semester hours of chemistry:		
CH X53 & CH X53K	Physical Chemistry I and Physical Chemistry Laboratory	4
CH 455	Fundamentals of Analytical Chemistry	4
BCH 369	Fundamentals of Biochemistry	3
Total Hours		**45**

Middle Grades Certification

Code	Title	Hours
EDC 339E	Secondary School Literacy across the Disciplines	3
Total Hours		**3**