



BS in CHEMISTRY EDUCATION (692828) MAP Sheet

Department of Chemistry and Biochemistry

For students entering the degree program during the 2016–2017 curricular year.

This major is designed to prepare students to teach in public schools. In order to graduate with this major, students are required to complete Utah State Office of Education licensing requirements. To view these requirements go to <http://education.byu.edu/ess/licensing.html> or contact Education Student Services, 120 MCKB, (801) 422-3426.

UNIVERSITY CORE AND GRADUATION REQUIREMENTS				PROGRAM REQUIREMENTS (80.5 total hours, including licensure hours)			
UNIVERSITY CORE REQUIREMENTS				<p>—For students accepted into the major after August 1, 2014, grades below C in any required coursework in a teaching major or teaching minor will not be accepted. Teacher candidates must maintain a total GPA of 3.0 or higher throughout the program and to qualify for student teaching. For details on admission and retention requirements for teaching majors and teaching minors, see Educator Preparation Program (EPP) Requirements. —The Chemistry and Biochemistry Department requires the final 10 hours of required chemistry credit must be taken in residence at BYU for this degree program. These hours may also go toward BYU's 30-hour residency requirement for graduation. —Contact the Education Student Services Office for entrance requirements into the licensure program. —A teaching minor is not required for licensure. However, it is strongly recommended.</p> <p>Complete the following:</p> <p>† Chem 111* Honors Principles of Chemistry 4.0 † Chem 112 Principles of Chemistry 3.0</p> <p>† Note: Chem 105 and Chem 106 may substitute for Chem 111 and Chem 112 with department approval.</p> <p>Chem 113 Introductory General Chemistry Lab 2.0 Chem 201 Chemical Handling & Safe Lab Practices 0.5 Chem 227 Principles of Chemical Analysis 4.0 Chem 351M Organic Chemistry - Majors 3.0 Chem 352M Organic Chemistry - Majors 3.0 Chem 391* Tech. Writing Using Chemical Literature 3.0 Chem 462 Physical Chemistry 3.0 Chem 495 Senior Seminar 1.0</p> <p>Complete the following:</p> <p>Math 112* Calculus 1 4.0 Math 113* Calculus 2 4.0 Phscs 121* Principles of Physics 1 3.0 Phscs 123* Principles of Physics 2 3.0</p> <p>Complete 3 hours from the following:</p> <p>Chem 354 Organic Chemistry Laboratory—Majors 2.0 Chem 464 Physical Chemistry Laboratory 1 1.0 Chem 465 Physical Chemistry Laboratory 2 1.0 Chem 497R Undergraduate Special Problems (See Education advisor for teaching related assignment.) 6.0V</p>	<p>Complete 9 hours from the following:</p> <p>Bio 100* Principles of Biology 3.0 Chem 331 Guided Learning for Chemistry Instruction 3.0 Chem 463 Physical Chemistry 3.0 Chem 481M Biochemistry—Majors 3.0 Geol 101 Introduction to Geology or 3.0 Geol 111 Physical Geology 4.0 Math 290 Fundamentals of Mathematics 3.0 Math 302 Mathematics for Engineering 1 4.0 Math 313 Elementary Linear Algebra 3.0 Math 334 Ordinary Differential Equations 3.0 Phil 423* History & Philosophy of Science 3.0 Phscs 127 Descriptive Astronomy 3.0 Phscs 137 Severe and Hazardous Weather 3.0 Phscs 140 Electronics Lab 1.0 Phscs 145 Experimental Methods in Physics 1.0 PWS 150* Environmental Biology 3.0</p> <p>With approval, certain other courses in physics, geology, mathematics, and biology may be taken to satisfy this requirement.</p> <p>Complete the following licensure requirements:</p> <p>Contact the Education Advisement Center, 120 MCKB, 422-3426, to schedule the final interview to clear your application for the secondary teaching licence. You should be registered for your last semester at BYU prior to the scheduled appointment.</p> <p>Complete the Professional Education Component:</p> <p>A. Complete the following:</p> <p>CPSE 402 Educating Students w/ Disabilities 2.0 IP&T 286 Instructional Technology in Teaching 1.0 Phy S 276 Exploration of Teaching 4.0 Phy S 377 Teaching Methods and Instruction 3.0 Phy S 378 Practicum in Secondary Education 1.0 Sc Ed 353* Multicultural Education 2.0 Sc Ed 375 Adolescent Dev & Classroom Mgt 3.0</p> <p>Note: FBI fingerprint and background clearance must be completed before enrollment into Phy S 276.</p> <p>B. Complete 12 hours from one of the following:</p> <p>Phy S 476 Secondary Student-Teaching 12.0 Phy S 496 Academic Internship: Secondary Educ. 12.0</p>		
Requirements	#Classes	Hours	Classes				
Religion Cornerstones							
Teachings and Doctrine, Book of Mormon	1	2.0	Rel A 275				
Jesus Christ & the Everlasting Gospel	1	2.0	Rel A 250				
Foundations of the Restoration	1	2.0	Rel C 225				
The Eternal Family	1	2.0	Rel C 200				
The Individual and Society							
Citizenship							
American Heritage	1–2	3–6.0	from approved list				
Global & Cultural Awareness	1	3.0	Sc Ed 353*				
Skills							
Effective Communication							
First-Year Writing	1	3.0	from approved list				
Adv Written & Oral Communication	1	3.0	Chem 391*				
Quantitative Reasoning	0–1	0–4.0	Math 112* or 113*				
Languages of Learning (Math or Language)	1	4.0	Math 112* or 113*				
Arts, Letters, and Sciences							
Civilization 1 and 2							
Civilization 1 and 2	2	6.0	from approved list				
Arts	1	3.0	from approved list				
Letters	1	3.0	Phil 423*				
Scientific Principles & Reasoning							
Biological Science	1	3.0	Bio 100* or PWS 150*				
Physical Science	2	6.0	Chem 111* and Phscs 121*, or 123*				
Social Science	1	3.0	from approved list				
Core Enrichment: Electives							
Religion Electives	3–4	6.0	from approved list				
Open Electives	Variable	Variable	personal choice				
GRADUATION REQUIREMENTS:							
Minimum residence hours required		30.0					
Minimum hours needed to graduate		120.0					

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (22 hours overlap)

FOR UNIVERSITY CORE OR PROGRAM QUESTIONS CONTACT THE ADVISEMENT CENTER
 Physical and Mathematical Sciences College Advisement Center
 N-181 ESC, Brigham Young University, Provo, UT 84602
 Telephone: (801) 422-2674

Department Advisement Center
 Steven Goates, Faculty Advisor
 C-104 BNSN, Brigham Young University, Provo, UT 84602
 Telephone: (801) 422-6269

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2016–2017

Suggested Sequence of Courses:

FRESHMAN YEAR**

<u>1st Semester</u>	
Chem 111 (F)	4.0
First-year Writing or A Htg 100	3.0 (3.0)
Math 112 (FWSpSu)	4.0
Religion Cornerstone course	2.0
Chem/Science/Math elective	3.0
Total Hours	16.0

2nd Semester

A Htg 100 or First-year Writing	3.0 (3.0)
Chem 112 (W)	3.0
Chem 113 (FW)	2.0
Chem 201	0.5
Math 113 (FWSpSu)	4.0
Religion Cornerstone course	2.0
Open electives	0.5
Total Hours	15.0

SOPHOMORE YEAR**

<u>3rd Semester</u>	
Chem 227 (FSp)	4.0
Chem 351M (F)	3.0
Phscs 121 (FWSpSu)	3.0
Religion Cornerstone course	2.0
Arts	3.0
Total Hours	15.0

4th Semester

Chem 352M (W)	3.0
Phscs 123 (FWSp)	3.0
Religion Cornerstone course	2.0
Chem/Science/Math elective	3.0
Social Science	3.0
Open electives	2.0
Total Hours	16.0

JUNIOR YEAR**

<u>5th Semester</u>	
Chem 462 (F)	3.0
IP&T 286	1.0
Phy S 276R (FW)	4.0
Civilization I	3.0
Religion elective	2.0
Open electives	2.0
Total Hours	15.0

6th Semester

Chem 391 (FW)	3.0
Chem/Science/Math elective	3.0
Sc Ed 353 (FWSpSu)	2.0
Sc Ed 375 (FWSpSu)	3.0
Civ 2 & Letters (double count)	3.0
Religion elective	2.0
Total Hours	16.0

SENIOR YEAR**

<u>7th Semester</u>	
Chem 495	1.0
Chem 497R or advanced lab elective	3.0
CPSE 402	2.0
Phy S 377 (FW)	3.0
Phy S 378 (FW)	1.0
Religion elective	2.0
Global and Cultural Awareness	3.0
Total Hours	15.0

8th Semester

Phy S 476 or 496 (FW)	12.0
Total Hours	12.0

THE DISCIPLINE:

The Chemistry Education Bachelor of Science degree provides preparation for chemistry/science high school teaching. High school chemistry teachers will find exciting opportunities available to help students take the first steps to becoming scientists. Chemists and biochemists study the fundamental processes that govern the natural world, including atomic structure and how atoms interact to form molecules and materials. They study the mechanisms of chemical processes, including those that underpin living systems such as the transfer of information from DNA to RNA to proteins. They work to develop simplifying models (theories) that permit the correlation and explanation of observations about the behavior of life to the structure of rocks and minerals. Chemistry and biochemistry provide an essential foundation for the medical sciences, engineering (especially chemical engineering), electronics, energy, environmental sciences, materials science, pharmacy, and virtually all manufacturing processes.

Chemistry and biochemistry are active branches of science that are vital to human existence. Inasmuch as the field embraces all aspects of the material world, it is subdivided into five areas of interest. Examples of these diverse areas include the regulation of protein synthesis, cellular signal transduction at the molecular level and proteomics (biochemistry), design and synthesis of medicinal compounds, catalysts and polymers (organic chemistry), design and synthesis of new molecular structures and materials (inorganic chemistry), spectroscopic study of energy transfer and molecular structures

(physical chemistry), and analysis of medicinal compounds, biological materials, and contaminants or trace elements found in the environment (analytical chemistry).

Chemistry and biochemistry involve far more than test tubes and beakers. They include sophisticated methodologies such as recombinant DNA technology, working with a variety of instruments such as mass spectrometers, calorimeters, chromatographs, ultracentrifuges, lasers, X-ray diffractometers, electron microscopes and nuclear magnetic resonance spectrometers, all of which are used by undergraduate chemistry and biochemistry students at BYU. Computers also play an important role in these disciplines, with applications ranging from simulation of molecules and their interactions to the collection and analysis of data.

CAREER OPPORTUNITIES:

Graduates in chemistry and biochemistry obtain positions in virtually every industry, and those who have imagination and intellectual curiosity are in particular demand. The discipline also provide an excellent preprofessional course of study for those interested in medicine, dentistry, law, and business. The chemistry and biochemistry curricula are both rigorous and intellectually rewarding.

****Note:** The department recommends a review of progress and planned registration with a faculty advisor by the end of the first week of classes in the first semester or term at BYU and in the semester when 30, 60, and 90 hours are completed. Call 422-6269 or come to C104 BNSN to schedule an appointment.

Note: Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.

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