

BA in Chemistry (692827) MAP Sheet

Physical and Mathematical Sciences, Chemistry and Biochemistry

For students entering the degree program during the 2018-2019 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR			
Requirements	#Classes	Hours	Classes	1st Semester		JUNIOR YEAR	
Religion Cornerstones				First-year Writing or American Heritage 3.0		5th Semester	
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	Biological Science 3.0	CHEM 462 (F) or CHEM 481M (F) 3.0		3.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	CHEM 111* (F) 4.0	PHSCS 220 (FWSu) 3.0		3.0
Foundations of the Restoration	1	2.0	REL C 225	MATH 112 (FWSpSu) 4.0	Civilization 1 3.0		3.0
The Eternal Family	1	2.0	REL C 200	Religion Cornerstone course 2.0	Letters 3.0		3.0
The Individual and Society				Total Hours 16.0	Total Hours 15.0		
American Heritage	1-2	3-6.0	from approved list	*With department approval, CHEM 105 may be substituted for CHEM 111.		481 can be substituted for 481M.	
Global and Cultural Awareness	1	3.0	from approved list	2nd Semester		6th Semester	
Skills				First-year Writing or American Heritage 3.0		CHEM 391 (FW) 3.0	
First Year Writing	1	3.0	from approved list	CHEM 112* (W) 3.0	CHEM 463 (W) or CHEM 468 (W) 3.0		3.0
Advanced Written and Oral Communications	1	3.0	CHEM 391*	CHEM 113* (FW) 2.0	CHEM 464 & 465 (W) or CHEM 482 (W) or other Requirement 4 2-3.0		3.0
Quantitative Reasoning	1	4.0	MATH 112* or 113*	CHEM 201 (FWSp) 0.5	Arts 3.0		3.0
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*	MATH 113 (FWSpSu) 4.0	Civilization 2 3.0		2.0
Arts, Letters, and Sciences				Religion Cornerstone course 2.0	Total Hours 16-17.0		
Civilization 1	1	3.0	from approved list	Total Hours 14.5	SENIOR YEAR		
Civilization 2	1	3.0	from approved list	* With department approval, CHEM 106 may be substituted for CHEM 112; CHEM 107 for CHEM 113.		7th Semester	
Arts	1	3.0	from approved list	SOPHOMORE YEAR		CHEM 584 (F) 3.0	
Letters	1	3.0	from approved list	3rd Semester		Religion elective 2.0	
Biological Science	1	3-4.0	from approved list	CHEM 227 (FSp) 4.0		Requirement 4 or open electives 10.0	
Physical Science	2	7.0	CHEM 111* and PHSCS 121*	CHEM 351M (F) 3.0		Total Hours 15.0	
Social Science	1	3.0	from approved list	STAT 201 (FW) or MATH 302 (FW) 3-4.0		8th Semester	
Core Enrichment: Electives				PHSCS 121 (FWSp) 3.0		CHEM 495 (FW) 1.0	
Religion Electives	3-4	6.0	from approved list	Religion Cornerstone course 2.0		Requirement 4 2.0	
Open Electives	Variable	Variable	personal choice	Religion Cornerstone course 2.0		Social science 3.0	
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (14 hours overlap)				Total Hours 15-16.0		Religion elective 2.0	
Graduation Requirements:				351 may substitute for 351M.		Open electives 6.0	
Minimum residence hours required		30.0		4th Semester		Total Hours 14.0	
Minimum hours needed to graduate		120.0		CHEM 352M (W) 3.0			
				CHEM 354 (FWSp) 2.0			
				PHSCS 123 (FWSp) 3.0			
				Religion Cornerstone course 2.0			
				CHEM 497R and/or open electives 4.5			
				Total Hours 14.5			
				352 may substitute for 352M; 353 may substitute for 354.			
				<p>Note: Enrolling in CHEM 497R gives students an opportunity to be mentored in a faculty's research lab and receive class credit. Enrollment in this course can be repeated for several successive semesters. Permission is required from the faculty member Contact the department office for specific details and to receive a permission-to-add code.</p> <p>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.</p>			

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2018-2019 Program Requirements (57.5 Credit Hours)

No more than 3 hours of D credit is allowed in major courses.

The Chemistry and Biochemistry Department requires the final 10 hours of required chemistry credit to be taken in residence at BYU for this degree program. These hours may also go toward BYU's 30-hour residency requirement for graduation.

REQUIREMENT 1 Complete 10 courses

CHEM 111 - Principles of Chemistry 1	4.0
CHEM 112 - Principles of Chemistry 2	3.0
CHEM 113 - Introductory General Chemistry Laboratory	2.0
CHEM 201 - Chemical Handling and Safe Laboratory Practices	0.5
CHEM 227 - Principles of Chemical Analysis	4.0
CHEM 351M - Organic Chemistry 1 - Majors	3.0
CHEM 352M - Organic Chemistry 2 - Majors	3.0
CHEM 354 - Organic Chemistry Laboratory--Majors	2.0
*CHEM 391 - Technical Writing Using Chemical Literature	3.0
CHEM 495 - Senior Seminar	1.0

Note: With departmental approval, Chem 105 may substitute for Chem 111, and Chem 106 for Chem 112.

REQUIREMENT 2 Complete 1 option

OPTION 2.1 Complete 4 courses

CHEM 468 - Biophysical Chemistry	3.0
CHEM 481M - Biochemistry--Majors	3.0
CHEM 584 - Advanced Biochemistry Methods 1	3.0
STAT 201 - Statistics for Engineers and Scientists	3.0

OPTION 2.2 Complete 5 courses

CHEM 462 - Physical Chemistry 1	3.0
CHEM 463 - Physical Chemistry 2	3.0
CHEM 464 - Physical Chemistry Laboratory 1	1.0
CHEM 465 - Physical Chemistry Laboratory 2	1.0
MATH 302 - Mathematics for Engineering 1	4.0

REQUIREMENT 3 Complete 5 courses

MATH 112 - Calculus 1	4.0
MATH 113 - Calculus 2	4.0
PHSCS 121 - Introduction to Newtonian Mechanics	3.0
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.0
PHSCS 220 - Introduction to Electricity and Magnetism	3.0

REQUIREMENT 4 Complete 3.0 hours from the following option(s)

After consulting with an advisor, complete 3 hours from the following:

OPTION 4.1 Complete 3.0 hours from the following course(s)

CHEM 397R - Mentored Outreach and Service Learning	3.0v
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CHEM 455 - Synthesis and Qualitative Organic Analysis	3.0
CHEM 462 - Physical Chemistry 1	3.0
CHEM 463 - Physical Chemistry 2	3.0
CHEM 464 - Physical Chemistry Laboratory 1	1.0
CHEM 465 - Physical Chemistry Laboratory 2	1.0
CHEM 481M - Biochemistry--Majors	3.0
CHEM 482 - Mechanisms of Molecular Biology	3.0
CHEM 489 - Structural Biochemistry	3.0
CHEM 496R - Academic Internship: Chemistry and Biochemistry	6.0v
<i>You may take up to 4 credit hours.</i>	
CHEM 497R - Undergraduate Special Problems	6.0v
<i>You may take up to 4 credit hours.</i>	
CHEM 514 - Inorganic Chemistry	3.0
CHEM 518 - Advanced Inorganic Laboratory	2.0
CHEM 521 - Instrumental Analysis Lecture	2.0
CHEM 523 - Instrumental Analysis Laboratory	2.0
CHEM 552 - Advanced Organic Chemistry	3.0
CHEM 553 - Advanced Organic Chemistry	3.0
CHEM 563 - Reaction Kinetics	3.0
CHEM 565 - Introduction to Quantum Chemistry	3.0
CHEM 567 - Statistical Mechanics	3.0
CHEM 569 - Fundamentals of Spectroscopy	3.0
CHEM 581 - Advanced Biochemical Methodology 1	3.0
CHEM 583 - Advanced Biochemical Methodology 2	3.0
CHEM 594R - General Seminar	0.5
<i>You may take up to 4 credit hours.</i>	
CHEM 596R - Special Topics in Chemistry	3.0v
<i>You may take up to 4 credit hours.</i>	
HONRS 499R - Honors Thesis	6.0v
PDBIO 360 - Cell Biology	3.0

Note 1: Elective courses must be different from required courses.

Note 2: With prior approval, certain 300-level and above courses in biology, engineering, physics, and statistics may be taken to satisfy this requirement.

Recommended Courses: Chem 195; Math 302, 303; PDBio 120; Phscs 140, 145.

Note: Supporting courses suggested by most medical and dental schools are found by visiting the Preprofessional Advisement Office. The more rigorous chemistry, mathematics, and physics courses required for the chemistry majors will satisfy the minimum requirements listed there. Elective courses in biochemistry and in biological science are especially pertinent to these preprofessional programs.

PLANNING REGISTRATION

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 801-422-6269 or come to C104 BNSN to schedule an appointment. New incoming students should attend the chemistry and biochemistry session during New Student Orientation, where they can meet with a faculty advisor and review their planned registration.

THE DISCIPLINE

The Chemistry Bachelor of Arts degree provides preparation for individuals in preprofessional programs (e.g., medicine, dentistry, business administration, or law). It also provides background for careers in chemistry-related professions (e.g., information specialist, safety engineer, forensics). 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

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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. The chemistry and biochemistry curricula are both rigorous and intellectually rewarding.

CAREER OPPORTUNITIES

Graduates in chemistry and biochemistry obtain positions in education and many different industries, performing analysis, synthesis, characterization, observation, and modeling. Those who work hard, are creative, and have intellectual curiosity are in particular demand. The discipline also provides an excellent preprofessional course of study for those interested in medicine, dentistry, law, and business.

MAP DISCLAIMER

While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

DEPARTMENT INFORMATION

Department of Chemistry and Biochemistry

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ADVISEMENT CENTER INFORMATION

Physical and Mathematical Sciences College Advisement Center

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